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ARMY CODE
No. 14985
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USER HANDBOOK
for the
GUN, 84mm, INF, ATK, L14A1

(This publication supersedes HB64 WO Code No. 14017)

DIRECTOR OF ARMY EQUIPMENT POLICY

1968

PREPARED AND PRINTED BY
INSPECTORATE OF ARMAMENTS
WOOLWICH

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CHAPTER 1

DESCRIPTION

SECTION 1 - INTRODUCTION

1. *The Gun.* The 84 mm INF ATK L14A1 gun (Frontispiece) is of the breech loaded and percussion fired type. There is no recoil as gas pressure, escaping rearward through the venturi, equalizes the recoil forces.
2. The weapon can be fired from the standing, kneeling, sitting or prone position. It may also be fired from a fire trench. A gun mount, which can be housed either in the gun butt or the front grip, supports the weapon in the prone position. The mount can also be used as a stabilizer, against the chest of the firer, in other positions.
3. *Sighting Arrangements.* Open sights are secured to the barrel and arrangement is made for the attachment of a telescope sight.
4. *Ammunition.* The only nature of ammunition currently approved for operational use with Gun, 84 mm Inf, Anti-Tank, L14A1 is the HEAT round. The introduction of HE, Illuminating and Smoke rounds, now under consideration, will widen the role of this equipment to include an anti-personnel and support role.
5. For training purposes, Practice and Drill rounds have been approved for use with Gun, 84 mm Inf, Anti-Tank, L14A1.
6. *Safety Precautions.* When a full calibre round is fired, the back blast, combined with solid fragments of the bottom plate of the cartridge, creates a danger area to the rear of the weapon. Personnel should not be allowed within this danger area which extends 30 metres rearwards and at an angle of 45 degrees (800 mils) either side of the line of the barrel.

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7. *Sub-calibre Adaptor* A sub-calibre adaptor (Chapter 4) is issued for training purposes. This fits inside the breech end of the barrel.

SECTION 2

MISCELLANEOUS DATA, SPARES AND ACCESSORIES

8. *Miscellaneous Data.* Total weight of weapon with cleaning equipment, tools, wooden base and

Canvas Cover 66 lb (approx).

Total weight of gun with gun mount, sight and sling 35 lb (approx).

Length of weapon 44.25 inches

Range of backsight 0 to 1000 metres

Practical rate of fire 5 to 6 RPM

Practical maximum firing range:

Anti-A.F.V.:

Stationary target 0 to 500 metres

Moving target 350 to 400 metres

Smoke and HE 0 to 1000 metres

9. *Barrel:*

Bore		Chamber	
Diameter	3.305 in	Length	9.5 in
Length of rifling	23.687 in	Diameter rear	3.488 in
Depth of grooves	0.040 in	Diameter front	3.397 in
Width of grooves	0.220 in	Taper	.16 minutes
Width of lands	0.220 in		
Number of grooves	24		
Number of lands	24		
Twist of rifling	- Right hand		
uniform 1 turn in	43 calibres		
Length of barrel	- 33.187 in		
with venturi	44.25 in		

10. *Venturi*:

Length	11.00 in
Diameter of parallel bore	2.875 in
Length of parallel bore	0.78 in
Major diameter of cone	5.00 in
Minor diameter of cone	2.875 in
Taper of cone	5 degrees 56 minutes

11. *Spares and Accessories*. The majority of the spares and accessories are carried in three canvas bags, each provided with a carrying sling, as follows:

12. Bag tools and spare parts, filled No. 1 Mk. 1 (Fig 1).

DESIGNATION	NUMBER/SETS
Bags tools and spare parts, empty, No.1, Mk.1	1
Sight, bore, muzzle, Mk.1	1
Sight, bore, breech, Mk.1	1
Roll, tools and spare parts, filled Mk.1.	1
Roll tools and spare parts, empty Mk.1	1
Drift, parallel, steel: 3.8 mm dia x 90 mm long	2
Firing rod spring	1
Fore-sight assembly	1
Screwdriver flat point 15 mm point x 150 mm long	1
Screwdriver flat point 9.5 mm point x 150 mm long	1
Screwdriver flat point 5/6 mm point x 150 mm long	1
Spare parts box (containing the following non-illustrated spares)	1
Extractor spring retaining screw	1
Extractor spring	1
Striker assembly	1
Firing mechanism front cap	1
Firing mechanism rear cap	1
Fore-sight pivot pin	1
Fore-sight retaining nut	1
Plate gauge, 0.25 mm (venturi clearance 'NO GO')	1

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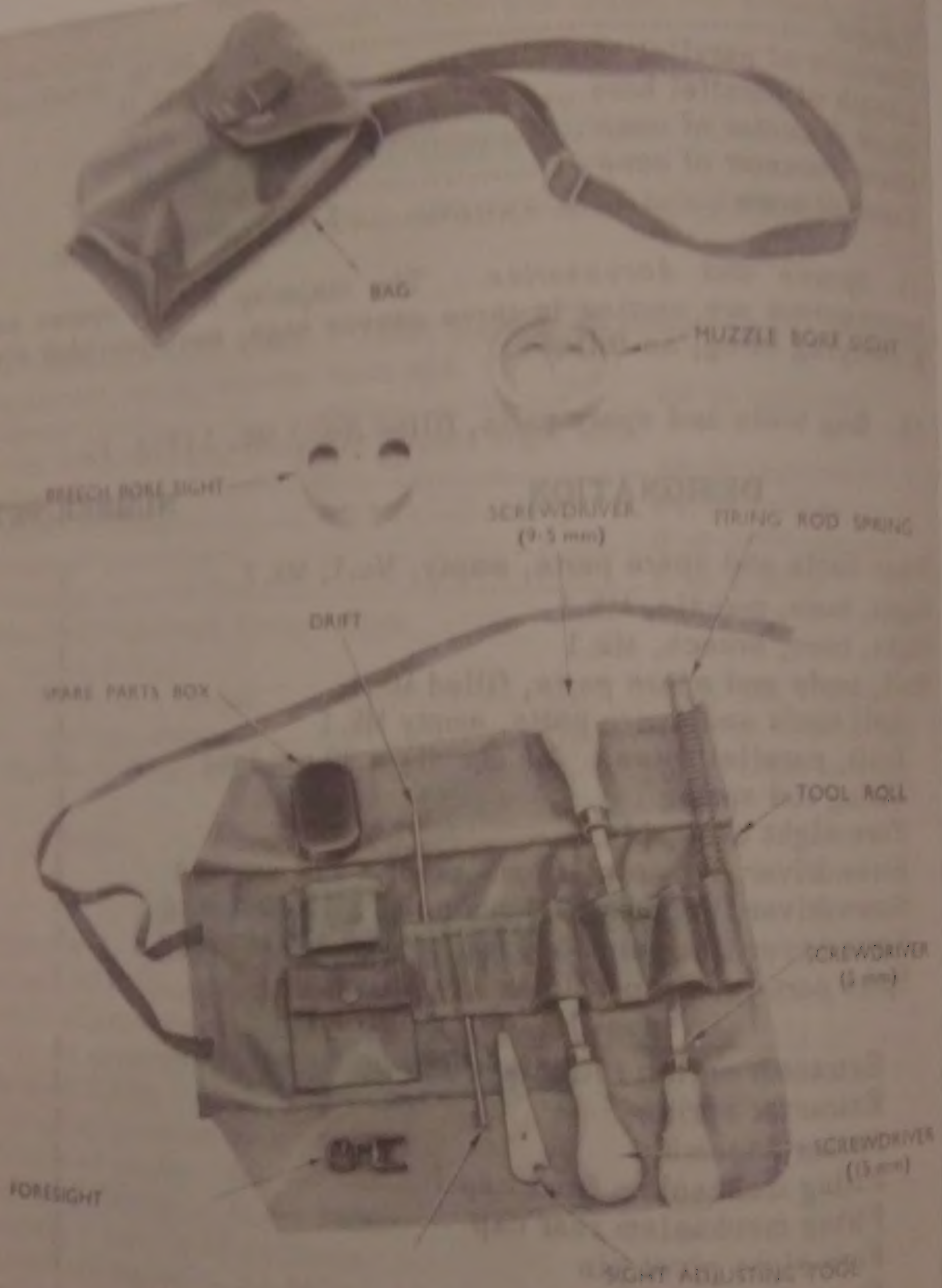


Fig. 1 No. 1 Tools & Spare Parts Bag

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Gauge scale indicator	1
Gauge scale indicator or trigger locking plate screw	2
Sear	1
Gage pin	1
Sear spring	1
Trigger mechanism gage retaining plate	1
Trigger pin	1
Trigger spring	1
Tool, adjusting, sight, 84 mm, Mk.1	1



Fig. 2 No. 1 Cleaning Tools Box

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13. Bag, tools cleaning, filled, No. 1 Mk. 1 (P12 12)

NUMBER/SETS

DESIGNATION

Bag, tools cleaning, empty No. 1 Mk. 1
Box, brush, cleaning, filled Mk. 1
Brush, cleaning Mk. 1
Box, brush, oiling, filled Mk. 1
Brush, oiling Mk. 1
Head, cleaning attachment Mk. 1
Rod, brush cleaning Mk. 1



LUMINOUS SIGHTING ATTACHMENT

Fig. 3 Sighting Attachment

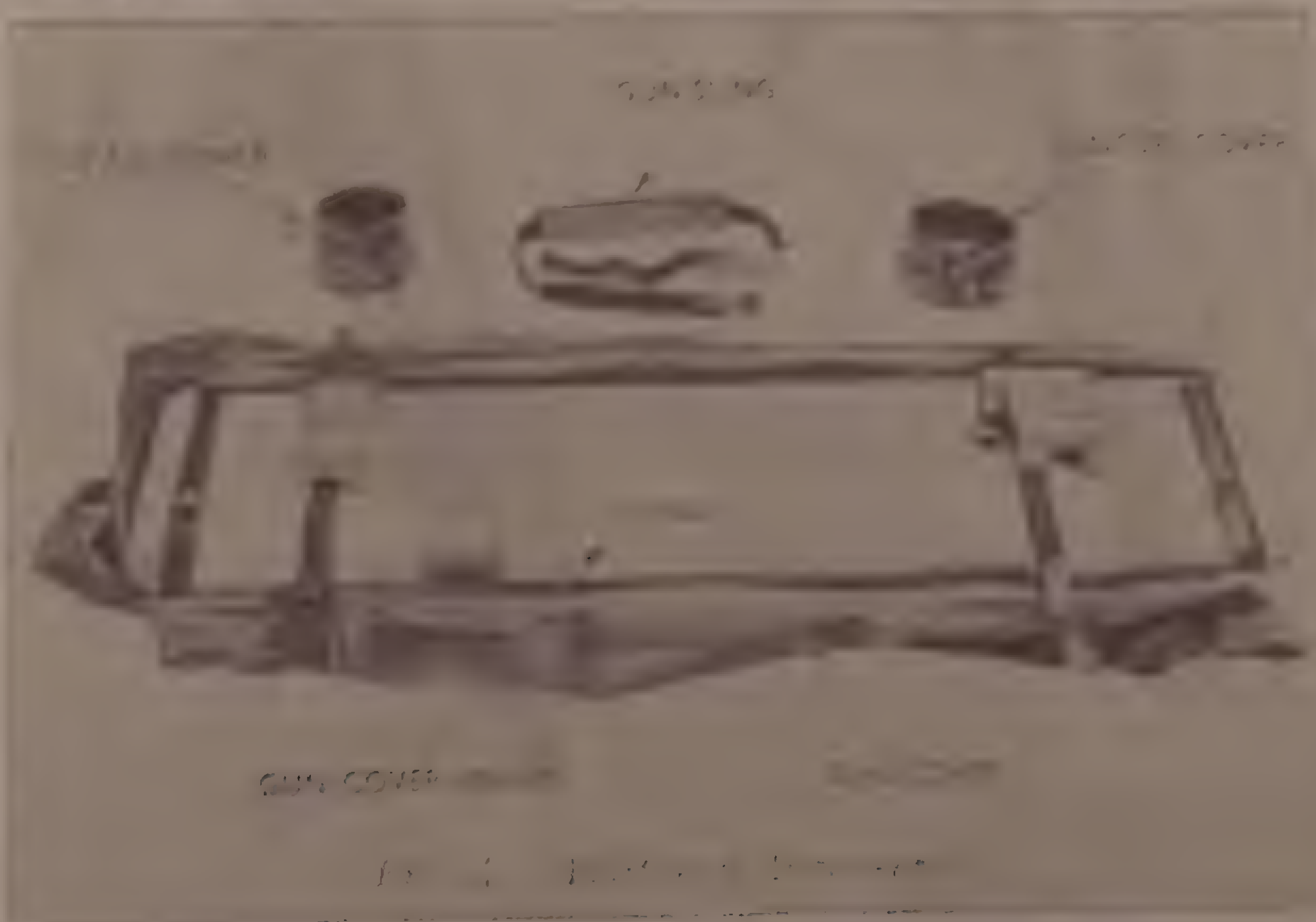
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14. Case, sightunit, 84 mm gun, Mk.1 (Fig. 2).

DESIGNATION	NUMBER/SETS
Brush	1
Cleaning cloth (Kalerinaxi)	1
Sighting attachments, luminous, cased, Mk.1	1
Sightunit, 84 mm, Mk.1	1

15. Additional accessories (Fig. 3).

DESIGNATION	NUMBER/SETS
Cover, muzzle, No.66, Mk.1	1
Cover, venturi, No.1, Mk.1	1
Cover, gun, Mk.1	1
Board, gun cover, Mk.1	1
Shrug, gun, Mk.1	1



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SECTION 3 - THE GUN

16. *General.* The gun (Fig 5) consists principally of a barrel, venturi, venturi fastening strap and firing mechanism, together with a gun mount housing and shoulder pad, front grip, and face pad, which are secured to the barrel by metal bands or clips and may, therefore, be adjusted to suit user requirements; in addition a gun mount and sights are provided.

17. *Barrel.* The barrel (Fig 6) comprises a forged steel tube which, internally, is shaped at the rear end to form the chamber and, from the front of the chamber, is rifled for the remainder of its length. Externally, the rear end of the barrel is enlarged in diameter and on the right side is formed with a guide over which the venturi guideway locates, in the closed position. Just below the guide are an extractor recess and an aperture for the firing pin together with a recess for the rear end of the firing mechanism housing. Secured to the bottom of the rear face is a triangular-shaped projection which guides the cartridge rim into its seating during the loading operation. On the left side of the enlarged diameter a lug is bored and screw-threaded for the venturi pivot pin and is formed with a stop face to limit the opening movement of the venturi. Above the lug the barrel is provided with a screwed hole for the venturi lock screw. Spaced along the lower right side of the barrel are two T-slots and two projections with screwed holes for the attachment of the firing mechanism housing. On the left side of the barrel two keyways, one wide and one narrow, house the sight unit mount and backsight bed, respectively, whilst at the front of the barrel a projection forms a housing for a fore-sight. Two sling swivels are fitted to the barrel for carrying purposes.

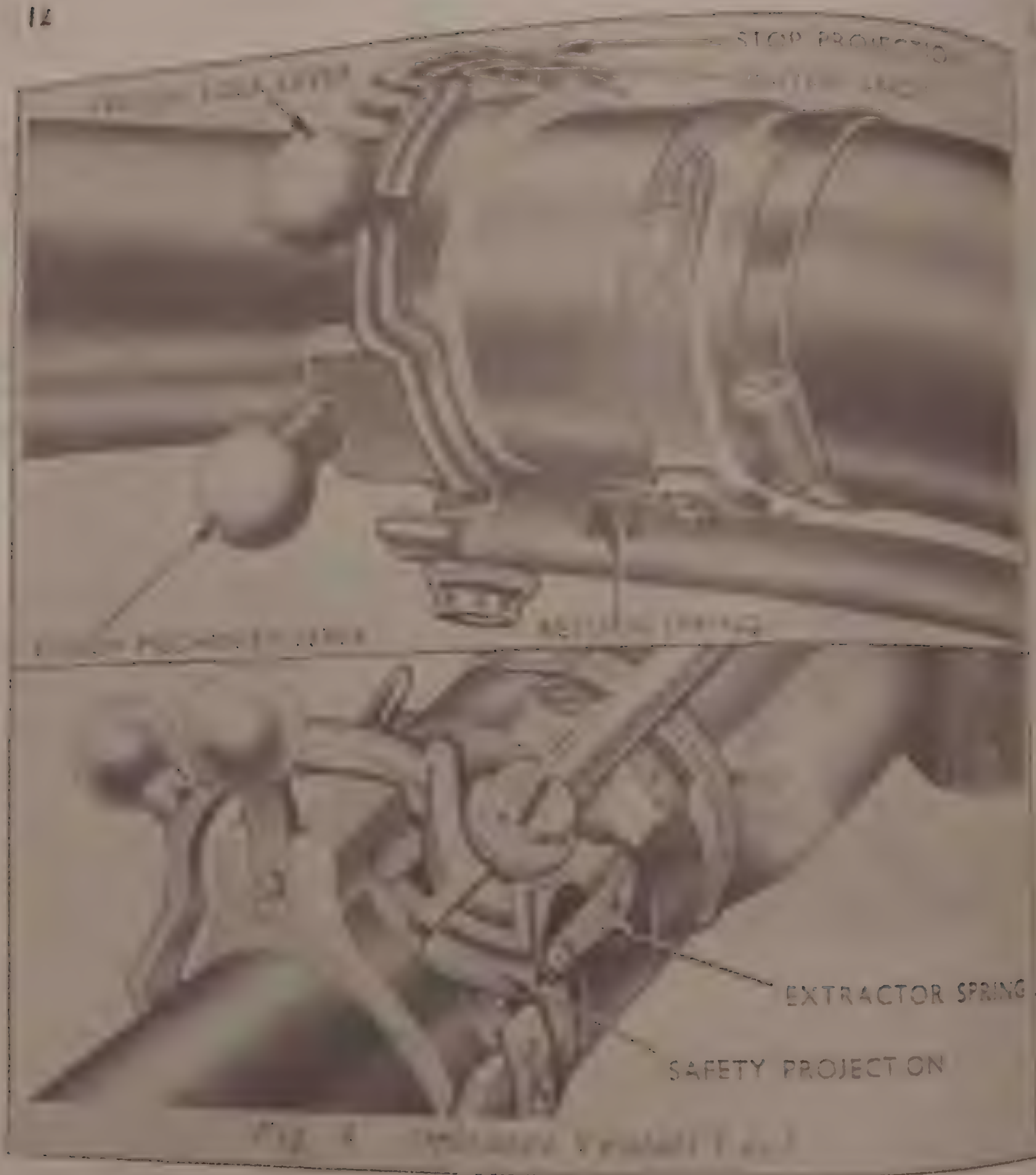
18. *Venturi.* The venturi (Fig 7) is in the form of a cone-shaped cylinder. At the rear end it is fitted with a rubber band in order to obviate metallic sounds, which would otherwise occur when closing the venturi, or, due to it being accidentally knocked against obstacles such as trees etc. This rubber band will quickly perish when the weapon is fired. When the band becomes



TRIGGER PIN APERTURE & RECESS

unservicable it should be replaced by a canvas gainer which covers the complete length of the venturi (Fig 5). At the front (narrow) end the venturi is formed with two lugs. The larger lug is fitted with a breech mechanism lever and is machined to form a guideway which locates over the guide on the barrel. The smaller lug is bored for the venturi pivot pin and has a projection which contacts the stop face on the barrel to limit the opening movement of the venturi. Formed between the two lugs is a rim which, on one side of the venturi is cut away to fit over the cartridge guide projection.





19. *Ordnance Venturi Lock.* The venturi lock (Fig 8) is semi-circular in shape, and is provided with a lever at the top to facilitate movement. The bottom of the right arm is shaped to house the rear end of the firing mechanism housing and the venturi lock return spring. At the rear of the housing the lock is formed with a safety projection which provides a safety factor in preventing the

gun being fired before the venturi is locked in the fully closed position. Below the projection the lock is recessed for the extractor which pivots on an axis pin, screwed into the lock. The projection nearer to the venturi lock lever, locks the venturi in the closed position. The left arm is bored at the bottom to house the venturi lock screw and the stop projection above this boring, acts as a bearing surface for the front face of the venturi during its closing movement, and retains the lock in the forward position.

20. *Firing Mechanism.* The percussion type firing mechanism (Fig. 9) is assembled on the right side of the barrel. It is contained in the firing mechanism housing, the forward portion of which houses the trigger, trigger sear and safe-fire catch, and also has a trigger guard and tubular fitting for the firing grip. Welded to the rear end, and at right angles to the tube, is the firing pin housing. Two T-slots and two lugs, drilled for securing screws, provide the means of attaching the firing mechanism to the barrel. Details of the firing mechanism are:

a. *Firing Mechanism Front Cap.* Screwed on the front of the firing mechanism housing the front cap forms a seating for the front end of the firing rod spring. A rubber ring (20.24 mm internal diameter by 2.62 mm thick) is fitted in the under cut at the bottom of the internal thread to prevent the cap working loose.

b. *Firing Rod Spring.* The coiled firing rod spring is interposed between the front cap and the head of the firing rod.

c. *Firing Rod.* Running throughout almost the entire length of the housing, the firing rod is prepared at the front with a milled head which passes through the firing rod spring. In the rear of this is the head of the firing rod, which in addition to forming a rear seating for the firing rod spring, is prepared on each side with a cocking notch and a recess for the cocking lever. Screwed on to the rear of the rod is a striker cam which is prepared on one side with an inclined surface and on the other with a small rib. This section of the rod thins off towards



the rear to allow passage through the aperture in the head of the firing mechanism housing.

d. *Trigger.* Of conventional shape, the trigger is pivoted in the firing mechanism housing by means of its axis pin, the top of the trigger houses a return spring and the head is suitably shaped to work in conjunction with the sear.

e. *Sear.* Pivoted to the rear of the trigger by means of its pin, the sear houses at the top, a coil spring at the front, and a cocking tooth at the rear.

f. *Safe-Fire Catch.* Assembled to rear of the sear, the safe fire catch pivots on its own shank, inside the housing. The shank is prepared with a cut-away flat which when uppermost allows free vertical movement of the rear end of the sear. The lever of the safe-fire catch is retained in either the safe or fire position by means of a raised boss.

g. *Trigger Mechanism Pins Retaining Plate.* Secured by a retaining screw to the housing, the retaining plate locks the shank of the safe-fire catch and the pins of the trigger and sear.

h. *Cocking Lever.* Passing through a slot in the firing mechanism housing, the cocking lever enters the head of the firing rod and is retained in position by two securing screws.

i. *Striker.* The cylindrical shaped striker, which houses the firing pin, passes through the aperture in the barrel and is held in position by the striker cam. The head of the striker is prepared with a 'T' shaped slot, and is chamfered to suit the striker cam of the firing rod. The correct firing pin protrusion is obtained by fitting washers around the firing pin in the striker housing. Weapons with serial numbers 35043 to 35992 inclusive were originally fitted with two loose washers. Weapons with serial numbers 35993 to 36742 inclusive were originally fitted with one loose washer, whilst number 36743

and all subsequent weapons have a single washer soldered into the striker housing. A programme of modification is being carried out and all weapons have been or will be finally fitted with a single washer soldered into the housing. Great care must be taken when stripping to ensure that the correct washers, if the weapon has not been modified, are replaced on assembly.

k. *Firing Mechanism Rear Cap.* Screwed on to the projection at the end of the firing mechanism housing, the rear cap allows access to the striker and prevents ingress of dirt and dust. A rubber ring (16.3 mm internal diameter by 2.4 mm thick) is fitted in the under cut at the bottom of the internal thread to prevent the cap working loose.



PAD ON REAR FACE
(SEEN ON FIG II)

GUN MOUNT HOUSING

Fig 10 Gun Mount

21. Gun Butt. The gun butt comprises a gun mount housing and shoulder pad (Fig 19) and is assembled as one unit and secured by a metal band; the two securing screws pass through the shoulder pad. The gun mount housing is bored to fit over the spring stem of the gun mount and is provided with a spring loaded retaining catch.

22. Front Grip. The front grip is in the form of a metal tube fitted with spring plunger, and provides an alternative position for the gun mount. It is secured to the barrel by a hinged strap and toggle catch. It should always be ensured that the grip is assembled with the plunger facing to the rear so that the latter does not interfere with the holding of the grip. The design of the front grip allows the Carl Gustav to be mounted on a pedestal, fixed to a bar, as the APC 432. When mounting the gun on the APC it must





be ensured that the front grip, and not the gun mount housing, is assembled over the pintle otherwise when firing, back blast will enter the vehicle.

a. *Front Grip (Old Pattern).* A certain number of equipments may be fitted with the old pattern front grip which comprises a metal band clamped around the barrel and secured by clamp plates and two screws which pass through the wooden grip.

23. *Face Pad.* Assembled on the left side of the barrel the face pad (Fig 11) is secured by two jubilee clips.

24. *Mount 84 mm Gun L1A1.* The gun mount (Fig 12) has a strong coil spring which terminates at the bottom in a two legged support and at the top in a cylindrical metal section. In this section, two holes and a groove in the vertical plane allows for adjustment of height of the gun. From the lower hole a horizontal groove leads to a third hole, at an angle of 35 degrees, which is to be used when firing in the standing, kneeling or sitting position.

SECTION 4 - SIGHTING ARRANGEMENTS

25. *Introduction.* The sighting arrangements are assembled on the left side of the gun and consist of a Mk.1 84 mm gun sightunit and an open sight.

26. *Mk.1 84 mm Gun Sightunit.* The sightunit (Fig 13) is the primary means of laying the gun and consists principally of a Mk.1 No. 78 sighting telescope and telescope mount.

27. *Mk.1 No. 78 Sighting Telescope.* The telescope is fitted with two scale drums which are used to bring the line of sight into alignment with the bore of the gun when zeroing. Rotation of the upper (elevation) drum results in vertical movement of the graticule, whilst rotation of the side (deflection) drum results in horizontal movement of the graticule. On the face of each drum is a scale graduated in mils, up to 15 mils each side of zero, each five mils being numbered. Engraved on the deflection drum are the letters R and L, together with arrows pointing to zero, to indicate direction of rotation of the drum when correcting the MPI in the horizontal plane. On the elevation drum direction of movement of the drum, when correcting for height of MPI, is indicated by plus and minus signs and the scale is read against index lines which are colour coded as follows:

a. *White.* The centre index line terminates in a white dot and is used to zero the scale when operating in temperatures

of four inches 18 degs. C to plus 10 degs. C.

b. Red. The four inch lens is laminated in a red dye and is to be used in temperatures above 18 degs. C.

c. Blue. The four inch lens is laminated in a blue dye and is to be used in temperatures below minus 18 degs. C.

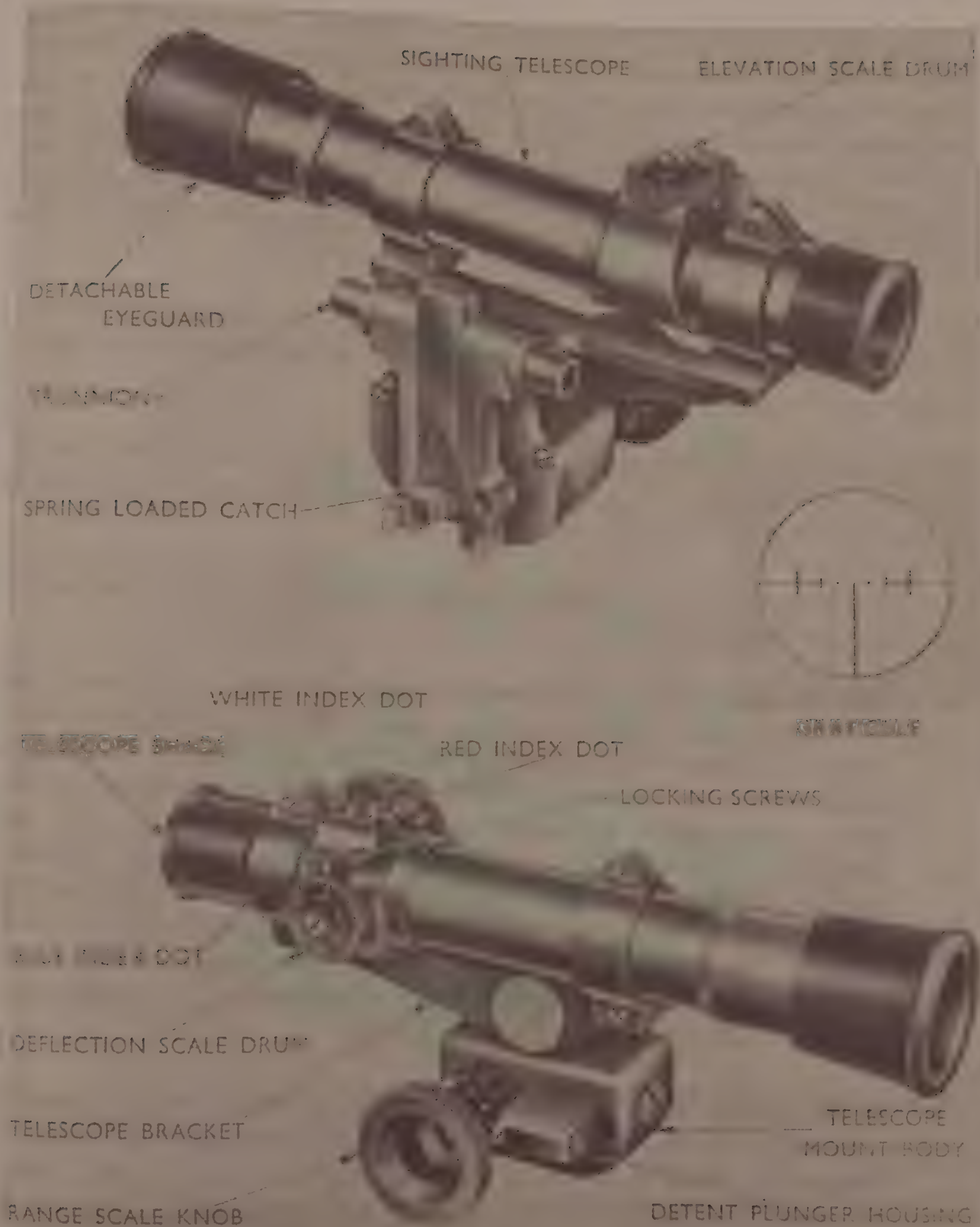
When adjustment the dials are secured by locking screws.

16. The optical arrangement of the telescope comprises a series of lenses which produce an erect image, as viewed from the eyepiece, with a magnification of two diameters and a field view of approximately 600 mils.

17. The graticule pattern is as shown in Fig. 13. The graticule represents zero elevation and zero deflection and is used for sighting. The lead marks represent aim off values and to speed of correction. Those on the right of the graticule being used for targets moving from right to left (near firing line) - Areas A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z. For targets moving from left to right, lead marks on the left of the graticule must be used.

18. Telescope Bracket. The telescope bracket is formed with two clamps, in which the telescope is secured and is pivoted to the range drum spindle thus providing means of adjusting the telescope to any required range.

19. Telescope Mount Body. The mount body houses the parts through which the range scale knob spindle is connected to the telescope bracket and, on its back face, is fitted with a spring loaded catch for attachment to the sightpost mount on the gun barrel. The range scale knob is formed with a knurled end and is engraved with two sets of figures representing range in feet and is engraved with two sets of figures representing range in feet of 50 metres. The left hand figures, from zero to 8, is divided white and are for use when firing HEAT shells. The right hand set, from zero to 18, are coloured LIGHT GREEN and are for use when



HE and SMOKE shell, should these be subsequently introduced into the service. Two parallel grooves around the circumference of the knob are provided with a number of dimples in which a spring loaded detent plunger engages to lock the knob at the required range setting. At the rear end the grooves are connected so enable the knob to be moved inward or outward on its spindle so that the required range scale may be read against an index on the detent plunger housing.

32. *Open Sight.* The open sight (Fig. 14) provides an auxiliary means of laying the gun and consists of a foresight and a backsight.

33. *Foresight.* The foresight is of the fixed blade type and is housed in a protective steel ring. It is attached by a pivot pin to a projection at the muzzle end of the gun.

34. *Backsight.* The backsight consists principally of a backsight bed and backsight slide.

a. *Backsight Bed.* Secured to the barrel by a dovetail, the backsight bed is fitted with a range scale graduated in hundreds of metres and numbered from 0 to 10. From 0 - 550 the graduations are coloured WHITE and are HEAT ranges in which also, reasonable accuracy may be obtained with HE and SMOKE. From 600 - 1000 the graduations are coloured LIGHT GREEN and indicate the ranges for HE and SMOKE shell, should these be subsequently introduced into the service. The bed is fitted with a vertical range screw which carries the backsight slide and is operated by means of a knurled head at the base of the screw.

b. *Backsight Slide.* The backsight slide is screw-threaded internally to accommodate the backsight range screw and is shaped to form a housing for the sight. In its rear face a dovetail groove in which a range scale indicator is retained by a clamping screw. Engraved on the inner face of the slide is a vertical deflection scale. The scale is graduated either



side of scale is five divisions and plus and minus signs are provided to indicate direction of movement of the MPI when setting the sight. Each division represents two miles and the scale is read against an index engraved on the inner edge of the indicator. The rear face of the indicator is engraved to read against the vertical range scale on the back sight bed and is colour coded for use in various temperature ranges as follows:

(1) *White.* The thick white line is the index line and is centred against the required reading on the range scale when operating in temperatures of minus 10 degs. C. to plus 30 degs. C.

(2) *Red.* A red mark above the white line indicates that the top edge of the line is to be used for indexing when operating in temperatures above 30 degs. C.

(3) *Blue.* The blue mark below the white line indicates that the bottom edge of the line is to be used for indexing when operating in temperatures below minus 10 degs. C.

c. The backsight slide is formed with a dovetail seating for the backsight and is fitted with inner and outer adjusting screws. Engraved on the rear face of the slide is a horizontal deflection scale which in all respects is similar to the vertical scale on the inner face of the backsight slide.

d. *Backsight.* The base of the sight is screw-threaded to accommodate the slide adjusting screws and is dovetailed into the backsight slide. Engraved on the rear edge of the sight is an index line which reads against the deflection scale on the slide. A steel wire ring is secured to the sight to form a backsight protector.

35. *Sight Attachment, Elevation Indicator* (Fig 15). The sight attachment consists principally of a cylindrical light alloy housing 2 1/4 inches in diameter and one inch thick. A bracket, secured to the housing by two screws, is used for attaching and locking the sight attachment to the detent plunger housing of the Sighting telescope. A small protective glass window fitted into the housing, enables the user to view the black index line against a self luminous background. The sight attachment weighs approximately 7 oz.

36. A sealed pendulum unit is fitted into the housing and is held securely in position by an adjusting disc, a rubber o-ring and a screw-in cover plate. The adjusting disc is retained in position by a small grub screw which passes through the housing and fits into a dimple in the adjusting disc. The sealed pendulum unit consists of a plastic housing which is filled with a clear damping liquid. Inside the housing the pendulum, which consists of a thin plastic rim and a cross member, is retained in position by jewelled



Fig 15 Sight Attachment, Elevation Indicator

pivots suspended between a pressed brass fixture, which is itself secured to the plastic housing. At one extremity of the cross member there is a heavy weight which takes up position on the vertical axis. The index line is marked on the plastic rim of the pendulum at 90° (1600 mils) to the weight. Attached to the brass fixture inside the sealed unit is a small assembly comprising a self luminous beta source and an aperture. The complete sight attachment is a sealed unit and must not be stripped by the user.

37. The sight attachment is used, when firing illuminating rounds, to determine the elevation of the gun. The mounting of the sight attachment to the telescope, allows the user to switch from the sight attachment to the telescope with ease since the presence of the sighting attachment does not interfere with the normal usage of the sighting telescope. Except at very short and very long ranges the illuminating round is best fired at a quadrant elevation of 20° (356 mils). At short and long ranges the elevation is 25° (445 mils). To obtain a quadrant elevation of 20° (356 mils) the gun is moved in elevation until the BLACK INDEX LINE is in the CENTRE of the LUMINOUS BACKGROUND. The BLACK INDEX LINE placed one line's width from the TOP of the "LUMINOUS BACKGROUND" gives the weapon a quadrant elevation of 25° (445 mils).

38. *Luminous Sighting Attachments.* A blade type foresight attachment and a backsight attachment are designed for assembly on the open sight of the gun for use during night firing. On their rear faces both attachments (Fig 14) have a number of dimples filled in with phosphorous. The foresight in addition, has the blade coated with phosphorous and the 'six o'clock' dot has been omitted in order to clarify the blade detail when sighting. The issue of these attachments has ceased but some may still be found with weapons issued at an early date.

CHAPTER 2

OPERATION

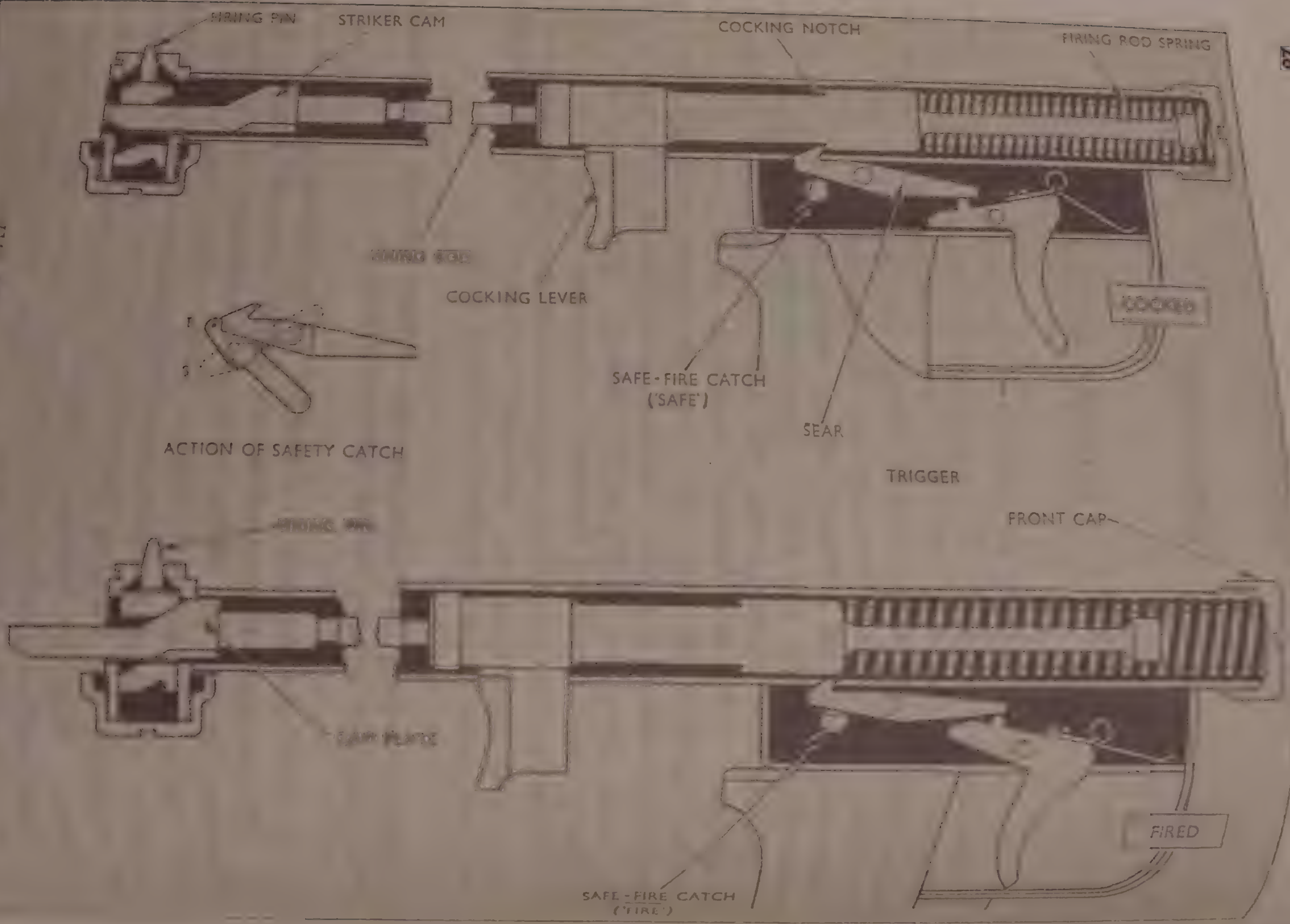
SECTION 1 - LOADING AND FIRING

39. *To Cock the Firing Mechanism.* The cocking lever is moved forward compressing the firing rod spring between the head of the firing rod and the front cap (Fig 16). Forward movement of the rod withdraws the striker cam through the aperture in the end of the firing mechanism housing and through the firing pin. The narrow projection on the right of the striker cam moves out of the recess in the firing pin and at the same time the inclined surface on the left side moves away from the inclined surface inside the firing pin. Further forward movement of the cam causes the inclined surface on the right side to engage with the inclined plate in the firing pin thus causing the pin to be withdrawn to the right away from the boring in the barrel. Meanwhile the head of the firing rod, in moving forward, causes the trigger sear assisted by its spring, to ride over, and come to rest behind the cocking notch, thus arresting any rearward movement of the mechanism. The mechanism is now cocked and ready to fire.

40. After cocking the weapon and before loading, the safe fire switch should be placed in the safe position.

41. *To Open the Venturi.* Cock the firing mechanism as in para. 39. This ensures that the rear end of the firing pin striker cam is withdrawn inside the firing mechanism housing away from the safety projection on the venturi lock. Move the venturi lock forward by means of the lever provided, thus compressing its spring and removing the locking projection from the left of the venturi gateway. With the fastening strap in this forward position rotate the venturi anti-clockwise until the stops limiting opening movement in the venturi and barrel meet. Once rotary movement of the venturi has commenced the venturi lock may be released.

Fig 16 Action of Firing Mechanism



42. *To Load the Round.* Insert the round into the chamber ensuring that the recess in the rim of the round is aligned with the cartridge guide of the weapon. Loading lines painted on the barrel of the weapon and on the round facilitate correct alignment. Push the round fully into the chamber.

43. *To Close the Venturi.* Using the lever provided, rotate the venturi clockwise. The venturi lock spring under compression, tends to move the lock to the rear but is prevented from so doing as the projection on the left arm of the venturi lock is fouling the front face of the venturi. Continue clockwise movement of the venturi until the guideway on the venturi completely engages with the guide on the barrel and the locking projection, on the venturi lock, has moved to its locking position on the left of the guide and guideway, under the impetus of its own spring. At this stage the safety projection on the right arm of the venturi lock has unmasked the aperture in the rear end of the firing mechanism housing.

44. *To Fire the Mechanism.* The trigger is pulled to the rear thus removing the sear from the head of the firing rod (Fig 16). The firing rod spring immediately re-asserts itself and via the firing rod head, causes the firing rod to move violently to the rear. In doing so the inclined surface on the face of the striker cam, strikes against the appropriate inclined surface in the firing pin thus causing it to move to the left and impinge upon the primer.

45. *To Eject the Round.* The extractor is positioned in front of the cartridge rim. After opening the venturi (para. 41) strike the venturi lock lever sharply forward to move the extractor rearward against the cartridge rim and thus unseat the round, or empty cartridge case, which is then removed by hand.

CHAPTER 3

SERVICING

SECTION 1 - GENERAL.

50. *Introduction.* The efficiency of the equipment depends to a great extent, on its mechanical condition. It is essential that all parts be kept in a serviceable condition by regular inspection and maintenance as spasmodic attention cannot produce the high standard required. All working surfaces will be kept clean and lubricated with oil OM 38 at temperatures above 40 degs. F and with oil 12% 15 below 40 degs. F; the old lubricant being removed and the surfaces inspected before a fresh coat is applied. Under no circumstances will abrasive material be used for removing rust. Moving parts should be operated frequently, especially after lubrication, to ensure efficient working. Full use should be made of existing covers to protect the equipment. All spare parts should be tested for inter-changeability and REME assistance obtained if necessary. Securing devices should always be in position and fully screwed home. Spare firing mechanism bearings will be issued with a thick washer soldered into the bottom of the striker housing. The thickness of this washer will require adjustment to suit the particular weapon in which the housing is fitted to attain the correct firing pin protrusion (1.7 mm to 2.0 mm).

Bore and Chamber

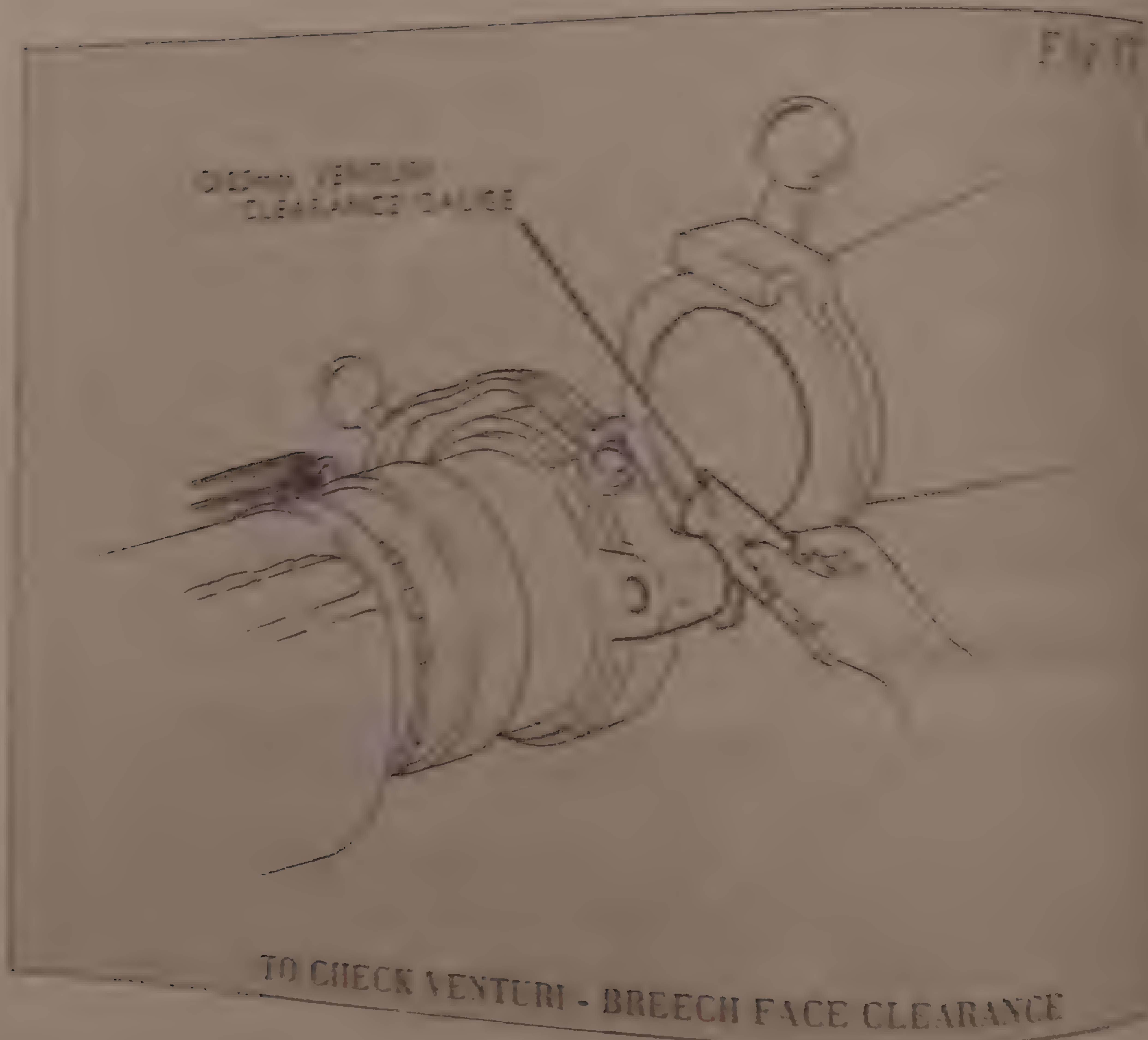
51. *Before Firing.* The bore and chamber, before firing, will be thoroughly wiped out to ensure they are clean and dry.

52. *After Firing.* The bore and chamber should be thoroughly cleaned using clean issue cleaning rag, soaked in oil OM 38, and brushes as required. When clean, dry out with clean dry rag and re-oil. Repeat daily for at least five consecutive days after firing.

RESTRICTED

13. To Check Venturi-Breech Face Clearance. After cleaning the clearance between the breech face of the venturi and the breech face of the breech of the venturi, the gauge must be inserted. The gauge is inserted in the venturi in the same position the B.33 mm venturi clearance gauge is held against the joint. The ITL is should not be passing in over the gauge into the joint. If it can be inserted, REPAIR must be followed and adjustment made to the setting of the pilot.

14. The Pump and Venturi assemblies. At all times and in pump and venturi assemblies should be kept clean and clear.



SECTION 2 - STRIPPING

55. *To Dismantle the Gun* (Figs 18 to 22). Prior to commencing dismantling operations, ensure that the gun is not cocked then proceed as follows:

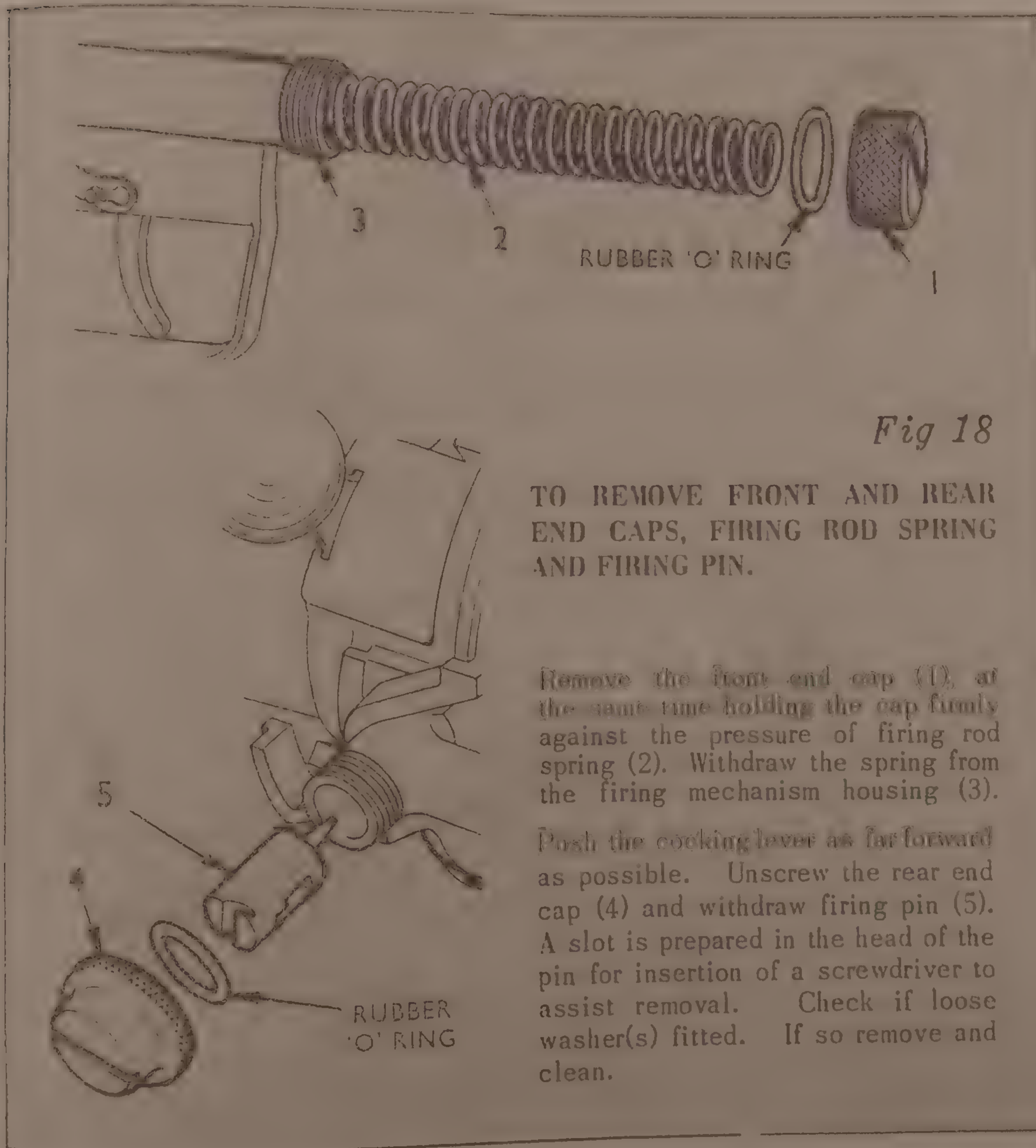


Fig 18

TO REMOVE FRONT AND REAR
END CAPS, FIRING ROD SPRING
AND FIRING PIN.

Remove the front end cap (1), at the same time holding the cap firmly against the pressure of firing rod spring (2). Withdraw the spring from the firing mechanism housing (3).

Push the cocking lever as far forward as possible. Unscrew the rear end cap (4) and withdraw firing pin (5). A slot is prepared in the head of the pin for insertion of a screwdriver to assist removal. Check if loose washer(s) fitted. If so remove and clean.

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FIG. 1. A perspective view of the device showing the hand pointing to the component.

FIG. 2. A perspective view of the device showing the hand pointing to the component.



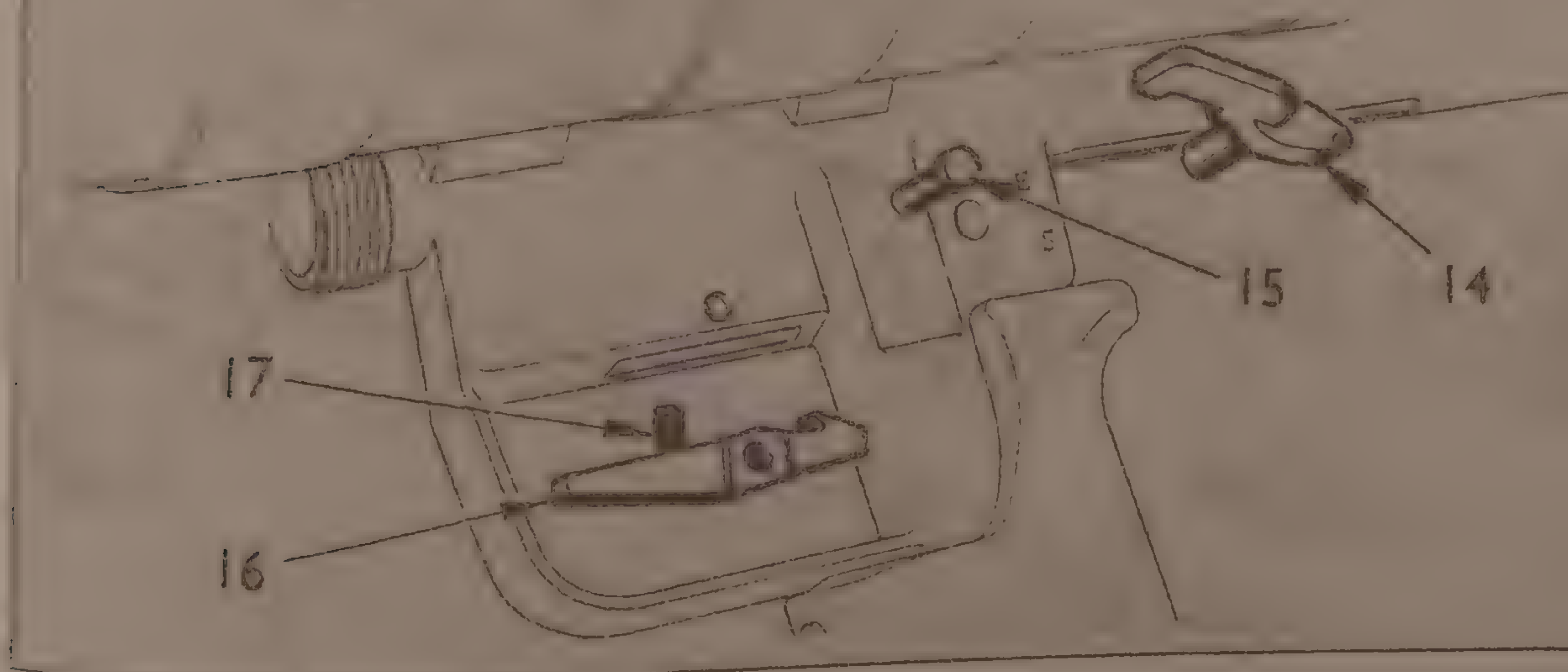
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TO REMOVE LOCKING PLATE, TRIGGER,
SAFE-FIRE CATCH AND SEAR.

Remove securing screw (10) and remove retaining plate (11) from the trigger, sear and safe-fire catch pins. Withdraw axis pin (12) and remove trigger (8) with its spring (13).

Remove catch (14). Withdraw the sear pin (15) and remove sear (16) with spring (17).

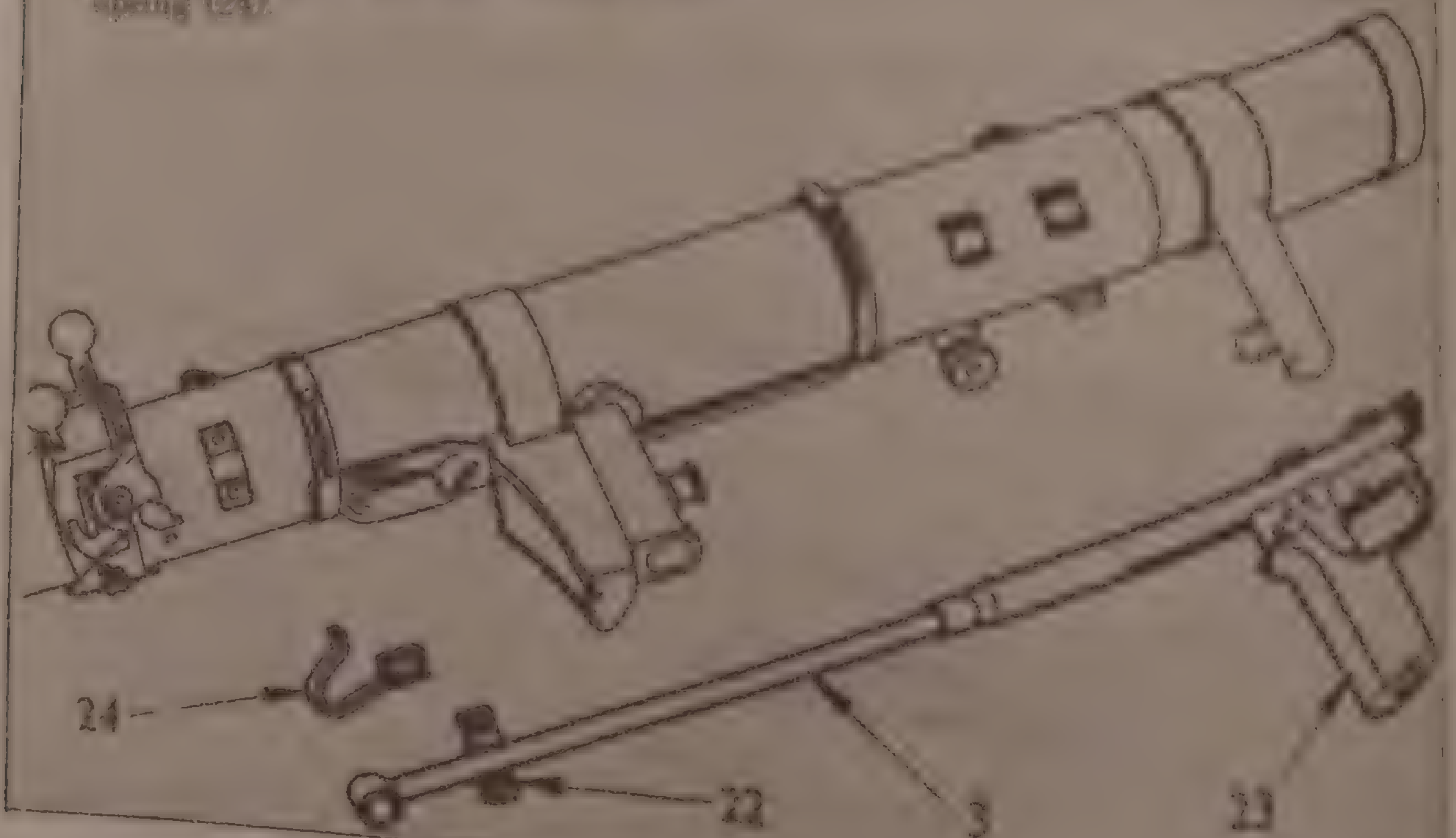
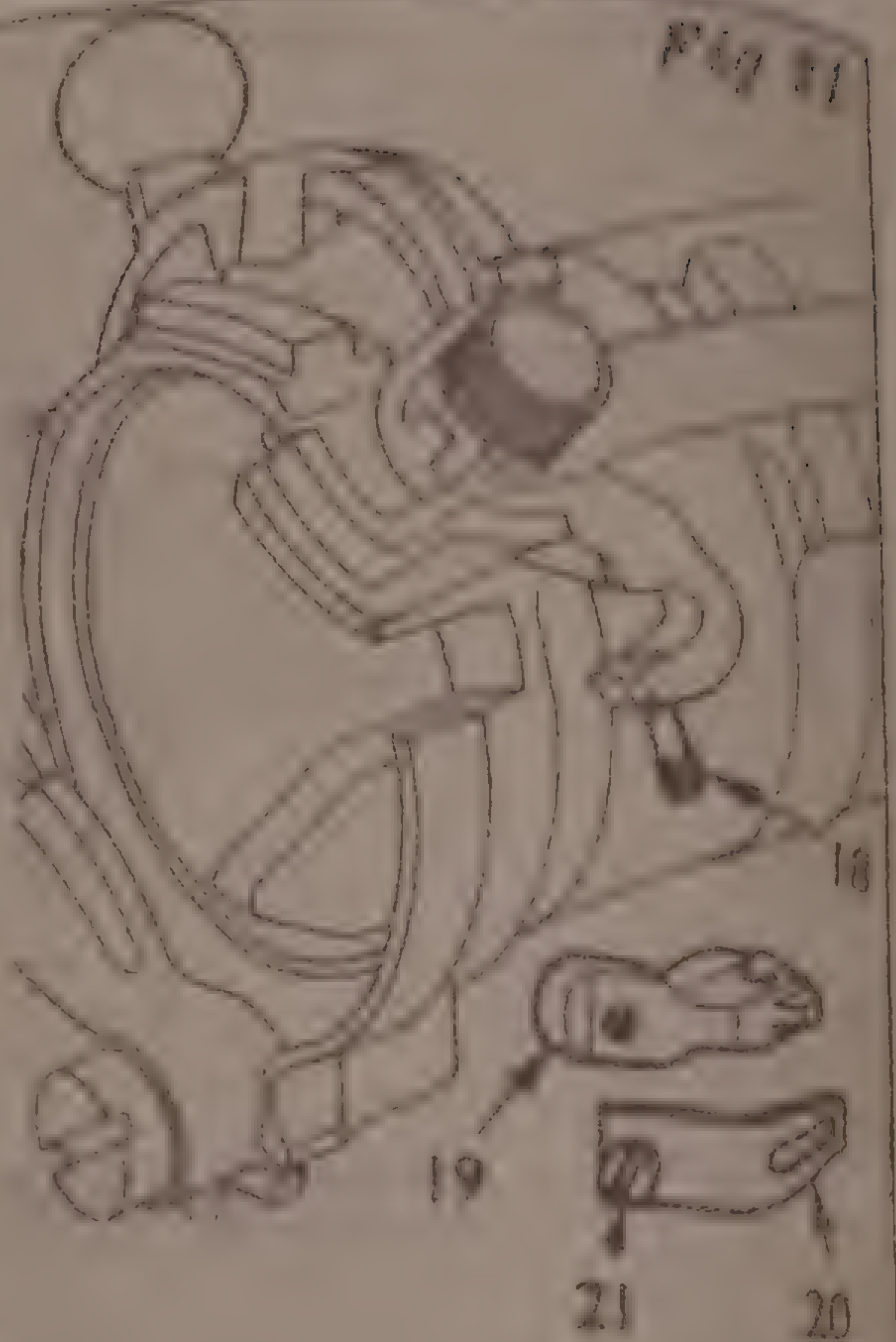


TO REMOVE EXTRACTOR,
EXTRACTOR SPRING, HOUSING
AND VENTURI LOCK SPRING.

Unscrew extractor axis pin (18) and remove extractor (19) with spring (20). Separate extractor and spring by removing screw (21).

Stripping beyond this point must only be carried out by REME or under REME Supervision.

Unscrew housing retaining screws (22). Ease the rear end of the housing (3) from its recess in the barrel and push forward on the firing grip (23) to free the housing from its dovetailed groove in the barrel. Remove venturi lock spring (24).





TO REMOVE VENTING AND VENTING LOCK

Open the venturi (75). Disconnect pin (26) and remove pin (27). Remove the venturi.

Disconnect pin (28) and remove venturi lock (29).



56. *To Assemble the Gun.* The gun is assembled in the reverse order to that for dismantling, care being taken to ensure that all parts are clean, free from grit or burrs and lightly lubricated with the specified oil. If the firing mechanism housing has been removed, care must be taken to ensure that the same housing is refitted on assembly.

57. *To Change the Firing Pin.* In event of a change of firing pin being necessary proceed as follows:

- a. Check that the mechanism is fired.
- b. Proceed as in Fig 18.
- c. Insert the new firing pin ensuring that both the inclined plane and the small recess are to the front, push the firing pin in as far as possible.
- d. Press the trigger, and pull the cocking lever to the rear.
- e. Replace the rear end cap.
- f. Insert the firing rod spring and screw on the front end cap tightly.
- g. Check the functioning of the mechanism.
- h. When a new firing pin is fitted, it is essential that REME ensure that a protrusion of 1.7mm to 2.0mm is obtained.

SECTION 3 - BORESIGHTING

58. *Matching the Sights to the Barrel.* Fit the muzzle and bore sights to the barrel and proceed as follows:

59. *Sighting Telescope:*

- a. Loosen the locking screws.
- b. Set the scale drums of the sight to zero.
- c. Look through the boresights and aim the barrel at a well-defined aiming point not less than 300 metres distant.
- d. By means of the elevation and deflection drums, move the graticule pointer into co-incidence with the aiming point.
- e. Tighten locking screws.
- f. Loosen the scales clamping screws, slip the scales to zero and tighten the screws.
- g. Check the setting.

60. *Open (iron) Sights.* Remove the sighting telescope and fold the open sights outward to their operative position:

- a. Set the backsight to zero.
- b. Look through the bore sights and aim the barrel at a well-defined aiming point not less than 300 metres distant.
- c. Using the range and adjusting screws move the backsight so as to align the open sights on the aiming point.
- d. Taking care not to disturb the elevation screw, unclamp the range scale indicator, set the indicator to zero and re-clamp.

e. The deflection cannot be similarly adjusted the reading should, therefore, be noted.

f. Check the setting.

61. *Confirmation by Firing.* Boresighting must be confirmed by firing full calibre ammunition. Set up a stationary penetrable target, on which an aiming point is marked, at a distance of 100 metres from the firing point and proceed as follows:

a. Sighting Telescope:

(1) Sight through the telescope and fire TPTP ammunition against the target.

(2) Measure the vertical and horizontal distance from the aiming point to the mean point of impact (MPI).

(3) Loosen the locking screws.

(4) Adjust the range and deflection drums of the telescope as required (one mil = 3.5 inches on the target).

(5) Tighten the locking screws.

(6) Confirm the drum settings by further firing and if satisfactory re-set the drum scales as in para. 59 (f).

b. Open (iron) Sights:

(1) Remove the sighting telescope and swing out the open sights to their operative position.

(2) Using the open sights take aim at the target and fire TPTP ammunition against the target.

(3) Measure the vertical and horizontal distance from the aiming point to the MPI.

(4) Adjust the backsight for height and deflection (on both scales one division = 2 mils (7 inches on target)).

(5) Confirm the settings by further firing and, if satisfactory, re-set the range scale reader to zero on the range scale. Note the setting of the deflection scale.



BARREL

ZEPHYRUS 2000



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CHAPTER 4

ADAPTOR, SUB-CALIBRE, 84 MM ORDNANCE, L1A1 & L1A2

SECTION 1 - DESCRIPTION

62. *Introduction.* The principal components of an 84 mm. Sub-calibre adaptor are a body and a firing mechanism. The L1A1 and L1A2 adaptor differ in the design of body each of which is loaded into the chamber in exactly the same manner as a normal full calibre round. The firing mechanism is common to both L1A1 and L1A2 adaptors. The adaptor is an expensive piece of equipment and must not be used, in lieu of a drill round, for the practising of loading drills.

63. *Body (L1A1 Adaptor).* The body of the L1A1 Adaptor (Fig 23) is of conventional bomb shape and is in two parts, screwed together at the rear end of the parallel portion. The rim at the base is identical with the rim of the full calibre cartridge case. Single and double lines, engraved on the base, respectively denote 'Safe' and 'Fire' settings for the firing mechanism. Forward of the rim, two diametrically opposite borings house the firing and safety plungers.

64. Internally, the body is shaped to house the firing mechanism and is fitted with a screw-threaded barrel sleeve to which the mechanism is attached when assembled in its housing. The barrel is screwed into the front end of the sleeve and is secured in position by a lock-nut. Two pairs of grooves are provided in the body; the smaller pair house the catch plunger of the firing mechanism whilst the larger pair house the toes of the firing mechanism sears when the mechanism has been fired. At the front end of the body is a boring through which the barrel protrudes and, spaced equidistant around the body are four zeroing screws for aligning the barrel to the parent weapon when zeroing. After zeroing the

screws are secured by grub screws housed in the front face of the body. The barrel is fitted at the muzzle end with a brass ferrule to prevent accidental damage to the bore of the parent weapon when loading.

65. *Firing and Safety Plungers.* Passing through the small bearings near the rim of the body, the firing and safety plungers are spring loaded. The safety plunger is 'proud' of the body and prepared at the top with a forward sloping head which causes the pin to protrude permanently inside the chamber, when the body of the sub-calibre adaptor is in the barrel. The firing plunger is flush with the body and has a 'flat' head.

66. *Body (L1A2 Adaptor).* The body for the L1A2 adaptor (Fig 24) differs from that of the L1A1 principally as follows:

- a. The body is similar in shape to the normal full calibre round. It is made in two parts screwed together and secured by a grub screw.
- b. The base is removable. It is secured to the body by a spring retaining ring and is located radially by a hollow spring pin. This arrangement permits replacement of the base when it becomes damaged sufficiently to adversely affect loading operations.
- c. The screw-threaded sleeve is retained in a plain housing within the body by two securing screws.
- d. The barrel is screwed into the sleeve and is locked by a dome-headed retaining screw which locates in one of a number of longitudinal grooves around the circumference of the barrel.
- e. At the front of the body, the boring through which the barrel protrudes is of large enough diameter to permit withdrawal of the barrel and sleeve without recourse to separating the two



portions of the body. The boring is closed by a body cover to which the hole for the barrel is eccentric to the centre of the cover.

'Buckling' of the cover, due to zeroing operations, can thus be eliminated by rotating the cover around the barrel.

f. In order to avoid losing loose sub-calibre rounds within the interior of the body a cone sleeve is assembled between the firing mechanism and barrel sleeve housings.

Note 1. It is to be noted that the barrel and its sleeve can be assembled in the body 180 degrees out of alignment thus causing the firing mechanism, on assembly in the body, to also be 180 degrees out of position and preventing correct operation of the safety plunger and sears. An alignment mark should therefore always be made on barrel and body before commencing dismantling operations.

67. *Firing Mechanism.* The percussion type firing mechanism (Fig 25) is assembled in the base of the body. At all times it must be cocked before it can be withdrawn from the body. The principle components are:

a. *Firing pin housing sleeve.* Cylindrical in shape, the housing sleeve of the firing mechanism is threaded externally for attachment inside the body. A cut-away shoulder at the rear, positions the sleeve relative to the firing mechanism housing. The front is shaped to form a guide and seating for the sub-calibre round, and bored to allow the firing pin to protrude. Internally the sleeve is bored to pass over the cocking sleeve.

b. *Housing sleeve retaining nut.* Passing over the housing sleeve, the retaining nut is bored and threaded internally, for assembly with the firing mechanism housing. The reduced diameter, in front of the thread, forms a collar which bears against the rear shoulder on the firing pin housing sleeve.

SEAR COVER

SEAR

SEAR SPRING



FIRING PIN



FIRING PIN
HOUSING SLEEVE

HOUSING SLEEVE
RETAINING NUT

c. *Cocking sleeve.* The hollow cocking sleeve is threaded internally at the front to receive the firing pin, and at the rear for attachment of the cocking sleeve cap. Externally it is formed at the rear end with an enlarged head and the safety and cocking notches. An elongated slot passing through the sleeve accommodates the retaining pin of the firing pin spring rear seating. The sleeve passes through both the firing mechanism housing and the housing sleeve.

d. *Firing pin.* The firing pin is threaded at the rear and screws into the front of the cocking sleeve. It forms a seating for the front end of the firing pin spring.

e. *Firing pin spring rear seating.* The rear seating for the firing pin spring is itself a firing pin which is turned to take the retaining pin. The front face forms the seating for the rear of the firing pin spring. It is not interchangeable with the firing pin.

f. *Firing pin spring.* Superimposed between the firing pin and its rear seating, the firing pin spring is housed inside its sleeve.

g. *Cocking cap.* Screw-threaded for assembly with the firing pin spring sleeve, the cocking cap terminates at the rear in a milled collar. This provides the means of cocking the mechanism.

h. *Firing mechanism housing.* The housing for the firing mechanism is prepared internally with a collar which limits the forward movement of the firing pin spring sleeve. Externally it is threaded at the front for attachment of the retaining pin of the firing pin housing sleeve. A boring passing through the threaded portion houses the retaining pin of the firing pin spring rear seating. Screwed into the front face is a stop screw, which limits the rotary movement of the housing sleeve. Two slotted projections on the rear face house the sears, their springs and axis pins. Passing through the rear face is the safety catch with plunger.

j. *Sears.* Two sears, one cocking (stamped A) and one safety firing mechanism housing and are each provided with a return spring. The cocking sear engages in front of the cocking safety sear is longer than the cocking sear and is 'hooked' to engage the safety cocking notch in the event of accidental operation of the cocking sear and thus arrest the forward movement of the firing pin. The safety sear is in two parts which pivot about a common axis pin bush and are connected to each other by a spring.

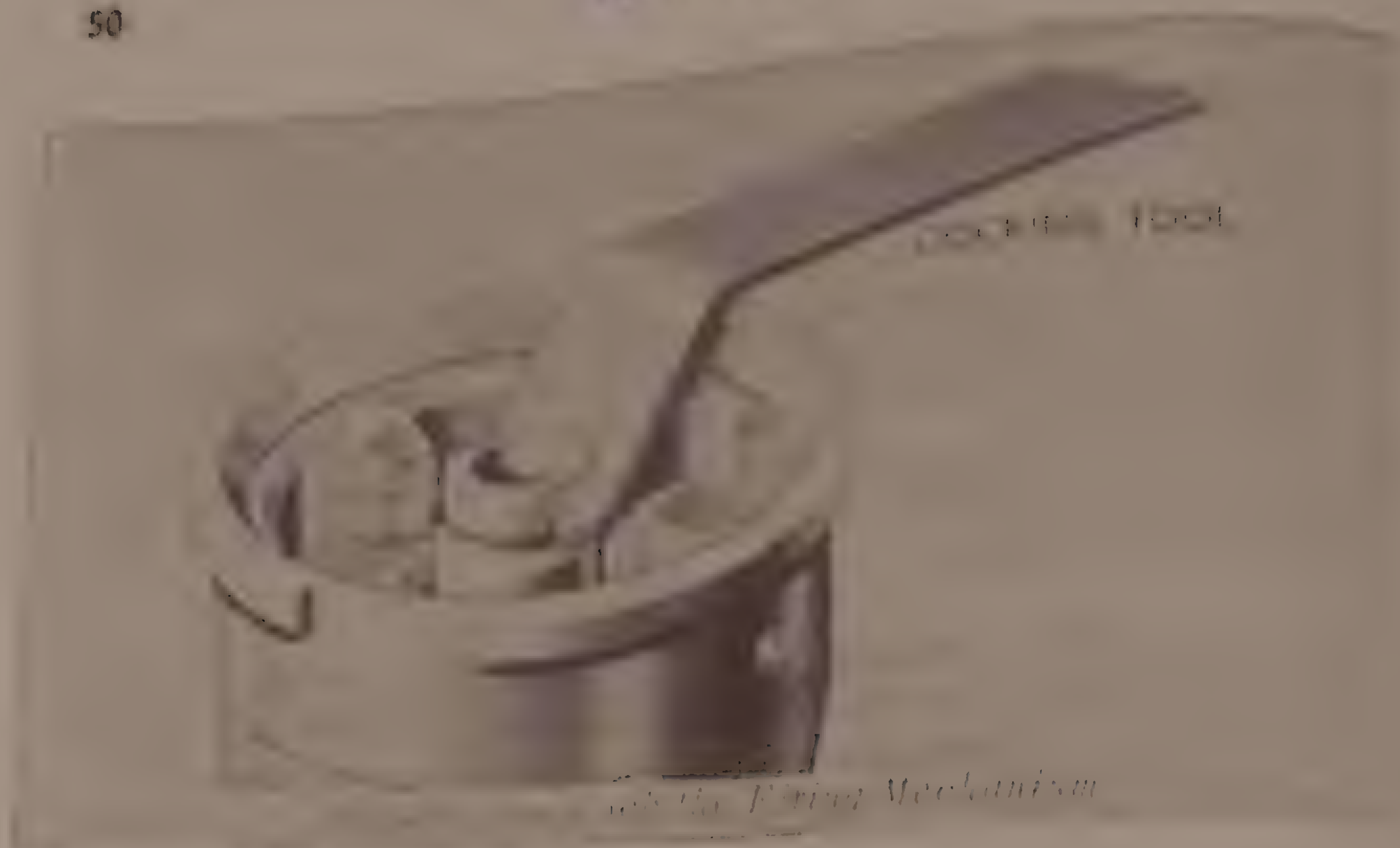
k. *Sear covers.* Passing over the projections on the housing, the sear covers have a cut-away aperture to allow the 'heels' of the sears to protrude slightly. The covers are secured in position by being 'sprung' over the ends of the sear axis pins.

SECTION 2 - OPERATION

65. *Operation.* Normally the cocking operation is carried out whilst the firing mechanism is assembled in the adaptor body.

a. *To cock the firing mechanism when assembled in the body of the sub-calibre adaptor.* (Fig. 26). Using the cocking tool provided, place the claws of the tool in front of the milled collar on the cocking cap.

Utilize the base of the body as a fulcrum and bear down on the cocking tool. This will cause the cap to come to the rear bringing with it the firing pin housing sleeve and the firing pin, thus compressing the firing pin spring between its rear seating in the housing and the rear face of the firing pin. Continuation of this movement will cause the toe of the cocking sear to engage in front of the cocking notch and so retain the mechanism in the cocked position.



b. *To withdraw the firing mechanism from the body of the sub-calibre adaptor.* Cock the mechanism, and using the projections of the firing mechanism housing for purchase, rotate the mechanism anti-clockwise until the thread on the sleeve clears the thread inside the body of the adaptor. Withdraw the complete mechanism to the rear.

Note 2. The mechanism can be cocked when separate from the adaptor, the cocking tool is useful to give a better grip than the knurled head of the cap. An alternative method is to remove the firing pin housing sleeve and its retaining nut (Fig 29 refers), place the firing pin on a suitable piece of wood and bear down on the firing mechanism housing until the mechanism is cocked. In this condition the cocking sear is engaging its cocking notch and the safety sear is forward of, but in line with, the safety cocking notch. Replace the housing sleeve and its retaining nut.



c. Place a 6.5 mm round into the seating at the front of the housing sleeve. (Fig 27).

d. *To assemble the firing mechanism in the body of the sub-calibre adaptor.* With the mechanism cocked, insert it into the base of the body, and using the projections on the firing mechanism housing for purchase, rotate the mechanism clockwise, past the SAFE position, until it is fully home. Turn the mechanism anti-clockwise into alignment with the 'S' on the adaptor body and the safety sear will be in the 'Safe' position with the sear hook in line with the safety cocking notch.

e. *To Insert the Adaptor into the Parent Weapon.* Turn the mechanism anti-clockwise to the 'FIRE' position. Fully open the venturi of the parent weapon and, ensuring that the recess in the base rim of the adaptor is aligned with the cartridge guide of the parent weapon, push the adaptor fully into the chamber. Fully close the venturi. Provided that the parent gun is ready and it is safe to fire, the sub-calibre

adaptor can now be fired. When the adaptor is fully loaded into the parent weapon the tapered head of the safety sear operating plunger is depressed by the chamber wall and actuates the safety sear clear of its cocking notch. Whilst the adaptor is fully entered in the chamber of the parent weapon, set at either 'SAFE' or 'FIRE'; the setting cannot be altered. In the 'FIRE' position rotation of the firing mechanism is prevented by the safety sear being engaged in the recess of the adaptor. Whilst in the 'SAFE' position the protruding safety sear operating plunger is a positive stop to firing mechanism rotation.

Note 3. The sub-calibre adaptor is a weapon system in itself and therefore, consistent with realism and correct drills, the mechanism should not be turned from 'SAFE' to 'FIRE' until immediately before loading (see para. 68e.).

Note 4. Failure to align the recess in the base rim with the cartridge guide will cause damage to the rim and future loading operations will be affected. A loading line painted on the barrel of the parent weapon and on the adaptor facilitate correct alignment.

f. *To Fire the mechanism.* The firing mechanism of the full calibre weapon is operated as described in para. 44 and thus causes its firing pin to impinge upon the firing plunger in the body of the sub-calibre adaptor. This in turn forces the heel of the cocking sear to the left thus withdrawing the toe of the sear from in front of its cocking notch. The firing pin spring now re-asserts itself and forces the cap, sleeve, and firing pin violently forward, the latter impinging upon the base of the sub-calibre round.

69. *Applied Safety.* When the firing mechanism is assembled in the adaptor body and set to Safe both the cocking sear and safety sear are completely clear of their operating plungers and prepared to be fired. The mechanism in this position cannot

70. *Mechanical Safety.* When the mechanism is cocked, it is held in the cocked position by the cocking sear being engaged in front of the cocking notch. The hooked safety sear, due to its extra length, is slightly forward of the second cocking notch and is not engaged. Should the mechanism be accidentally fired, prior to being correctly loaded into the parent gun, the forward action will be arrested by the safety sear engaging its cocking notch, and firing pin protrusion is prevented.

a. Any pressure applied to actuate the safety sear when it is engaged, either manually, or by inserting the adaptor in the parent gun, will only compress the connecting plunger spring in the sear, the sub-calibre cannot fire and no mechanical damage is caused. During sub-calibre practice with the parent gun, the safety sear is only actuated clear of the cocking notch, when the adaptor is fully inserted. In this position the full mechanical safety of the parent gun applies to the adaptor.

SECTION 3 - SERVICING

71. *Introduction.* The same care and attention should be paid to the sub-calibre adaptor and its mechanism, as to the weapon itself. Section 1 of Chapter 3 refers. The mechanism should be kept clean and slightly oiled with oil OM 58 at temperature over 40 degs. F. and with oil OX 18 below 40 degs. F. The bore should be treated in the same way as the main weapon. At all times when not in use the mechanism should be uncocked to relieve compression from the firing pin spring. This may be done by loading the sub-Calibre adaptor into the parent weapon and operating the gun firing mechanism.

Zeroing the Sub-calibre Adaptor

72. *Relevant Data:*

a. Correct mean point of impact (MPI) - level, 4 inches to right of aiming point.

b. Permissible variation, - within 4 inch radius of correct MPI.

c. Zeroing range - 100 metres.

d. One half turn of adaptor zeroing screw - 10 inches at target.

73. *Zeroing.* Ensure that the gun has first been zeroed (paras 58 to 60) then proceed as follows:

a. Aiming at a stationary penetrable target at a distance of 100 metres, fire a group of three 6.5 rounds.

b. From the aiming point on the target, measure the vertical and horizontal distance to the MPI.

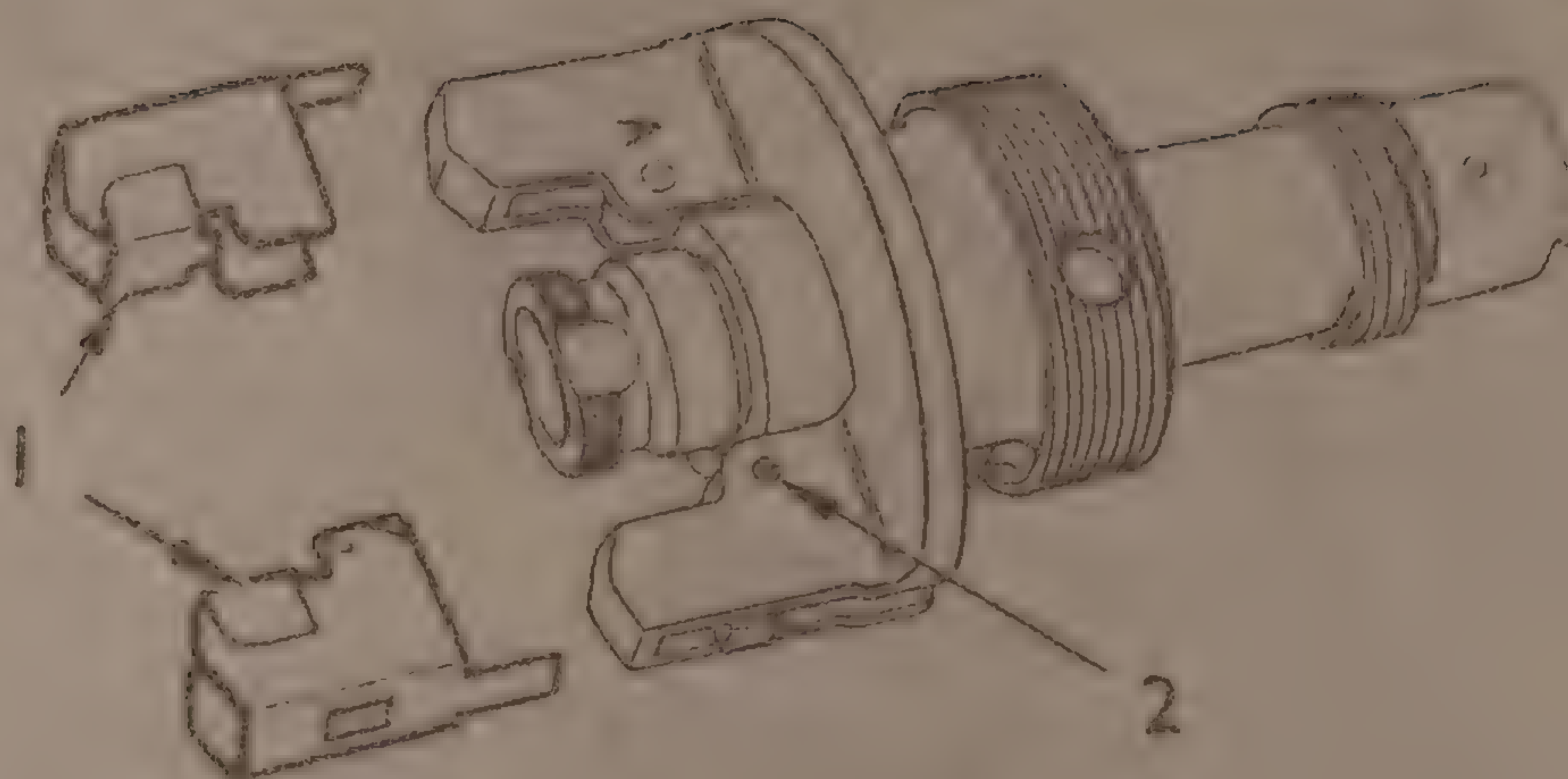
c. If necessary, slacken the grub screws in the adaptor and adjust the zeroing screws as required (para 72d). Tighten the grub screws.

d. Check the adjustment by firing a new three-round group.

e. Repeat a. to d. until adaptor is correctly zeroed.

74. *Stripping.* To dismantle and assemble the firing mechanism. (Figs 27 - 31). Cock the mechanism and withdraw it from the body as described in para 68a and para 68b, then proceed as follows:

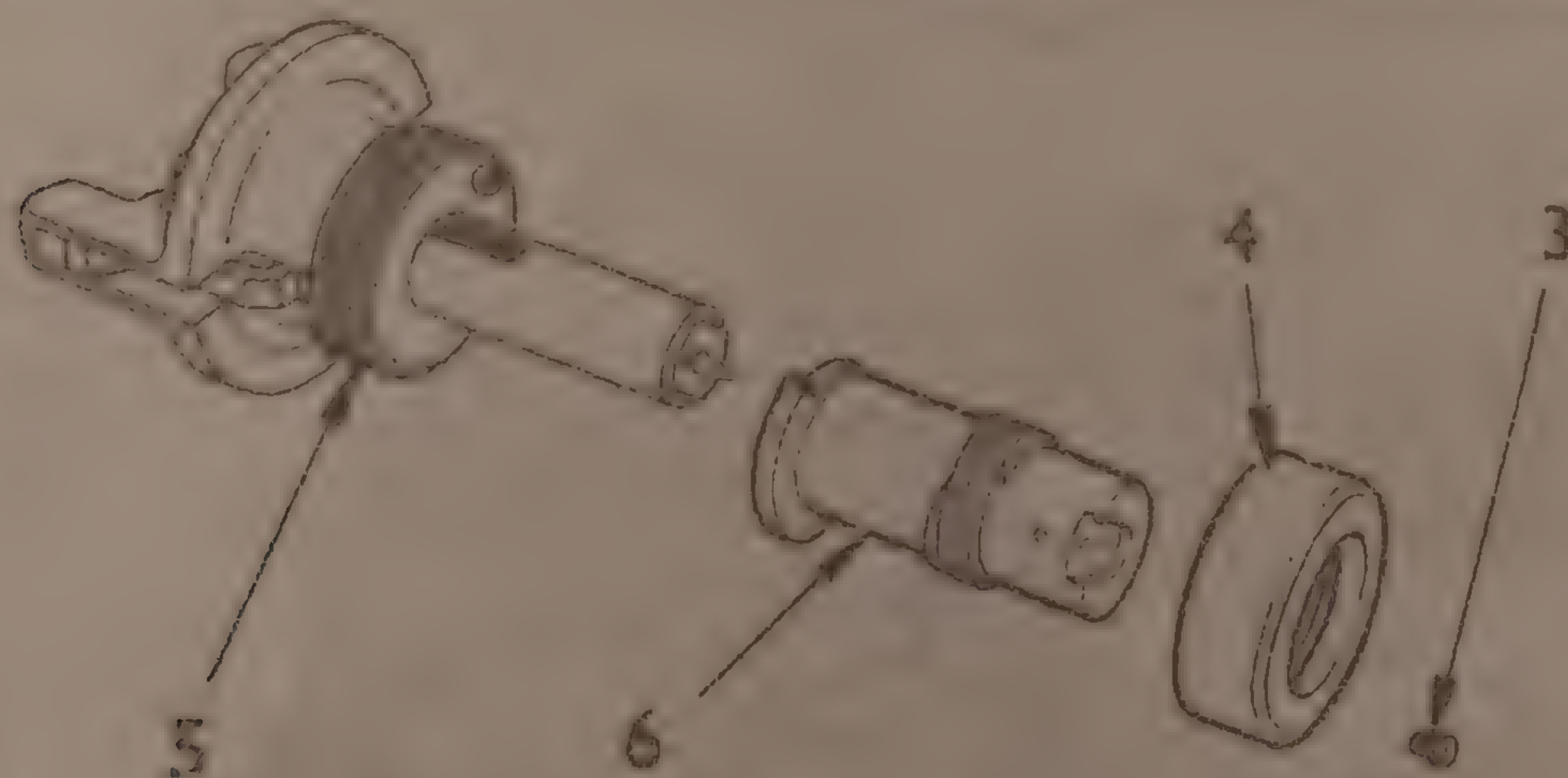
Fig 28



TO REMOVE SEAR COVERS

Using a screwdriver, prise the sear covers (1) off the sear axis pins (2) and remove the covers.

Fig 29



TO REMOVE FIRING PIN HOUSING SLEEVE

Remove securing screw (3) and retaining nut (4) from the firing mechanism housing (5). Withdraw firing pin housing sleeve (6). Fire the mechanism by resting the firing pin on a block of wood, bearing down on the mechanism housing and operating both sears.



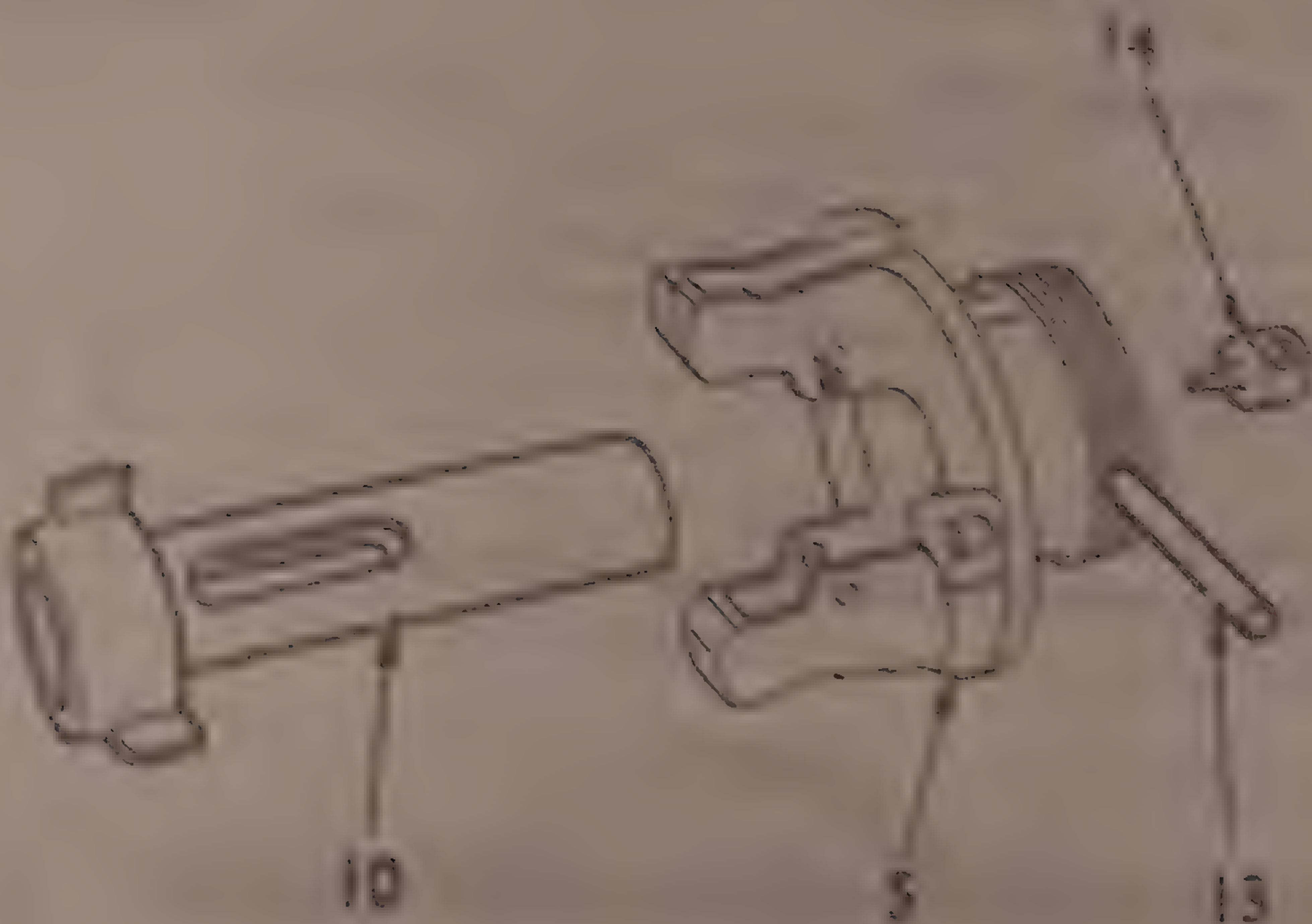
FIG. 1. PERSPECTIVE VIEW.

FIG. 1 is a perspective view of the device showing the main parts and the manner in which they are connected. The device is a mechanical assembly consisting of a central cylindrical component with a flange at the top. A curved arm is attached to the side, and a vertical rod extends from the top. A hand is shown interacting with the assembly, possibly adjusting a component. The drawing is a line sketch with some shading to indicate form.



FIG. 2. PERSPECTIVE VIEW, SHOWING THE DEVICE IN A DIFFERENT POSITION.

FIG. 2 is a perspective view of the device showing the main parts and the manner in which they are connected. The device is a mechanical assembly consisting of a central cylindrical component with a flange at the top. A curved arm is attached to the side, and a vertical rod extends from the top. A hand is shown interacting with the assembly, possibly adjusting a component. The drawing is a line sketch with some shading to indicate form.



TO REMOVE COCKING SLEEVE AND REAR SEATING

Remove retaining pin (13) and spring seat seating (14) withdraw cocking sleeve (10) from the firing mechanism housing (5).

16. The mechanism is assembled in the reverse order to that for dismantling. It must be ensured that the mechanism is cocked, as described in Note 2. before assembling the firing pin housing and its retaining nut.

SECTION 4 - TOOLS AND ACCESSORIES

70. The following table lists the tools and accessories applicable to the sub calibre adaptor.

DESIGNATION	NO/SETS
Brush, cleaning small arms, No.4, Mk.1	1
Case, 84 mm ordnance sub-calibre adaptor, Mk.1	1
Container, oil and cleaning brush, Mk.1	1
Container, pullthrough, Mk.1	1
Pullthrough, Mk.8	1
Tool, cocking sub-calibre, Mk.1	1
Wallet, 84 mm ordnance sub-calibre adaptor, Mk.1	1



Fig. 13 Sub-calibre adaptor

AMMUNITION

SECTION 1 - INTRODUCTION

77. The ammunition used with Gun, 84 mm Inf. Anti Tank, L14 is of British and Swedish manufacture. HEAT Practice Anti Tank and Drill Anti-Tank are the only natures used in British Land Service at present but the use of HE. Illuminating and Smoke Ammunition is under consideration. Details of these rounds will be promulgated as and when authority for its introduction has been given.

78. The ammunition is of the fixed type, that is, the cartridge case, with its propelling charge and other components, form one complete unit with the projectile. The unit, designated a 'round', is loaded into the weapon in one operation.

79. *Energy of Recoil.* When a gun is fired the pressure of the gases generated by the burning propellant is absorbed as follows:

a. *On BL and QF Gun Equipments.* The pressure of the gases generated by the burning propellant within the chamber of the gun is exerted in all directions. Thus, the same pressure which propels the projectile along the barrel also acts in the opposite direction against the breech, causing the gun to recoil. This energy of recoil is absorbed by the buffer incorporated in the recoil system of the equipment.

b. *On RCL (recoilless) Guns.* The pressure of the gases generated by the burning propellant within the chamber of the gun is also exerted in all directions, propelling the projectile along the barrel and, acting rearwards, disrupting the base of the cartridge case which is ejected in the gas stream from the

cartridge fitted in the rear of the gun barrel. This system is designed to provide a means of guidance and control of the round during its flight, which is the normal condition in the case of rounds in flight in the present type of weapon.

14. For training purposes a sub-caliber adapter is provided for use with the 84 mm Anti-Tank gun. The adapter is described in Section 2.

SECTION 2 - ROUNDS

Case, Cartridge, Assembly (see Figs 21, 22 & 23)

15. This assembly is common to all rounds of 84 mm ammunition used in British Land Service, drill rounds excepted. It comprises a Case, Cartridge, Igniter, RCL Cartridge and Primer, Cartridge, Percussion, L.L.

a. Case, Cartridge. The case, made of aluminium alloy, is approximately 9.41 inches (239 mm) long with thickened walls at the rear end which is formed with a flange. When the round is loaded, a slot cut in the flange engages with a cartridge guide projecting from the rear face of the gun barrel. The engagement of the slot and the guide ensures the correct alignment of the primer, which is located in the side of the cartridge case, and the striker of the firing mechanism of the gun. For the future, cases will have a cone coloured line painted longitudinally on the side to assist the loader to correctly align the round, so that the slot cut in the flange of the case will engage in the guide on the gun.

b. Igniter, RCL Cartridge. There are two variants of this igniter, which are similar except for the filling in the plastic dome. The igniter is cemented to the rear end of the cartridge case and consists principally of a plastic cartridge case base to which is cemented a plastic dome containing a quantity of

igniter composition. A capsule containing a black powder pellet is located in the side of the dome and is positioned to bring it in line with the primer which protrudes into the cartridge case. The filling hole in the top of the dome is closed by an aluminium disc. The dome of the igniter incorporated in the L41A2 practice round is filled with about twelve grams of an igniter composition comprising five grams of PKR No 2 and seven grams of NK 700. The dome of the igniter incorporated in the L40A3 and L40A4 HEAT rounds, and the L41A3 practice round, is filled with about twelve grams of an igniter composition comprising five grams of GP and seven grams of NK 700.

c. *Primer, Cartridge, Percussion, L13.* The primer, with its gasket, is located in the side of the cartridge case and is cemented in position. It consists principally of a flanged brass case, a brass anvil, capsule, and a 0.027 gram black powder pellet. The capsule, located in the bottom of the case, consists of a copper cup partially filled with 0.05 gram of composition Z2A covered by a tin disc, the composition and disc being pressed and hollowed to take the lower portion of the anvil. The black powder pellet is inserted in the top of the anvil and covered with a tin disc, the lip of the primer casing being turned over on to the disc. On firing, the anvil nips and ignites the capsule composition, the resulting flame from which ignites the powder pellet. The flame from the second ignition passes to and ignites the capsule and main fillings of the igniter.

Rounds, HEAT

82. *Round, 84 mm Inf, HEAT, L40A3, Fuzed L42, Tracered.* (Fig. 34). Of British manufacture, this round consists of a case, cartridge assembly: tube, stabilizing: propellant charge, driving band and Shell, 84 mm Inf, HEAT, Fuzed (SX 403GF). The estimated weight of the round is 2,550 grams (5.7 lbs approximately).

a. *Case, Cartridge, Assembly.* For details see para. 81.

b. *Tube, Stabilizing*. An aluminum alloy, the stabilizing tube functions as an adaptor for the attachment of the shell to the cartridge case and provides stability during flight at compass rate for the low rate of spin. The forward end of the tube is formed with a shoulder, the surface of which is cemented to the mouth of the cartridge case. Internally, the forward end is screw threaded for the attachment of the shell, the threads being coated with cement before the assembly of the shell.

c. *Propellant Charge*. This consists of a nominal weight of 830 grams of strip propellant AG 2001.

d. *Driving Band*. Located in a groove at the rear end of the shell, the plastic driving band, sometimes known as the "slipping ring", is designed to slip whilst the shell is travelling through the barrel of the gun, thus reducing the rate of spin to less than 1,000 revolutions per minute at the muzzle of the gun. This arrangement provides the means of stabilizing the shell at the point of impact with the target to give better penetration. It should be noted that, if the shell could be fired from the gun without spinning and with just that velocity which would ensure contact immediately on impact with the target, an ideal set of conditions would be attained and perfect penetration would be achieved. The fitting of the slipping ring is a means of getting as close as this ideal is possible by producing a low rate of spin.

e. *Shell, 2 1/4 in. dia, HEAT, Fuzed (CX 402/2)*. This is a 'hollow charge' type of shell, so called because the HE charge is filled to the rear of and in contact with the outer surface of a copper cone, thereby forming a cone shaped hollow in the forward portion of the charge. The special shape thus given to the charge has the effect of focusing the energy generated on detonation into a small, fierce jet of hot gas and molten copper which moves at a very high velocity to penetrate the target. The shell consists principally of a fuze adaptor, exploder and distance tube assembly; body, shell; exploder assembly; Tracer, LS and Fuze, Nose, Percussion, Direct Action, I.12.

(1) *Exploder and Distance Tube Assembly* (see Fig 39). The assembly is attached to the shell body by a screwed collar and is a means of giving the 'stand off' distance from the fuze to the main HE charge. The 'stand-off' required at the moment of impact of the fuze with the target to ensure that the fierce jet of hot gas and molten copper, generated by the detonation of the main charge, is correctly focussed to enable the maximum force of penetration to be obtained. The assembly consists of a steel distance tube and a CE exploder which functions as a booster to the fuze. Internally, the tube is screw-threaded at the front to accept the exploder locking ring and a fuze adaptor. The rear end of the tube is formed with a dished head which centres the shell in the gun.

(2) *Body, Shell*. The shell body comprises a screwed collar, shell case and base, each made of aluminium alloy and screwed and cemented together. This assembly accommodates a cone and flash tube assembly and the main HE charge of approximately 550 grams of RDX/TNT/60/40. The cone and flash tube assembly is cemented in position and consists of a copper cone to which is swaged and cemented one end of a brass flash tube. The other end of the tube is seated in a support washer shellacked to a sliding washer which is assembled between the base of the shell body and the body of the exploder assembly.

(3) *Exploder Assembly*. Screwed into the base of the shell body, the exploder consists of an aluminium alloy body containing a filling of approximately 35 grams of CE. A rubber gasket and steel ring, fitted between the base of the shell body and the flange of the exploder body, give protection to the main HE charge and exploder filling from the hot propellant gases.

(4) *Tracer L8*. For details see Section 3.

(5) *Fuze, Nose, Percussion, Direct Action, L42*. For details see Section 4.

(6) 'Spoiler' Ring. When the 'fuze' is assembled to the shell an aluminum alloy 'spoiler' ring is fitted immediately behind the fuze to give the shell additional stability during flight and improved accuracy performance.

83. Round, 84 mm Inf, HEAT, L40A4, Fuzed L42, Tracered. This round is of Swedish manufacture and is similar to the L40A3 round described in para. 82.

Rounds, Practice, Anti-Tank

84. Practice rounds are sometimes known as "Target Practice Tracer Projectile" rounds, abbreviated as "TPTP" rounds.

85. Round, 84 mm Inf, Practice, Anti-Tank, L41A2, PRF Tracered. This round is of Swedish manufacture and is similar to the L41A3 model described in the following paragraph, differing mainly in that it is not fitted with a spoiler ring and its lighter composition in the dome (see para. 81b).

86. Round, 84 mm Inf, Practice, Anti-Tank, L41A3, PRF Tracered (Fig. 35). Of British manufacture, this round differs from the L40A3 HEAT round only in the shell which is Shell, 84 mm Inf, Practice, Anti-Tank, PRF, Tracered, (BX 474 GPR). This shell differs from the HEAT shell principally in the following details:

- a. A Plug, Representing, Fuze is fitted in lieu of a fuze.
- b. The shell body incorporates an inert main filling.
- c. The exploder hole is assembly without a filling.

87. Round, 84 mm Inf, Practice, Anti-Tank, L41A4, PRF Tracered. This round is of Swedish manufacture and is similar to the L41A3 round described in para. 86.



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88. *Round, 84 mm Inf, Illuminating, Para, L44A1, Fuzed L77* (Fig 36). This round is of Swedish manufacture and consists of a case, cartridge, assembly, propellant charge and a flare shell fitted with an L77 fuze. The estimated weight of the round is 6 lb 12 oz.

a. *Case, Cartridge, Assembly.* For details see para.81.

b. *Propellant Charge.* This consists of a nominal weight of 330 grams of strip propellant AKB204.

c. *Fuze, Time, L77A1.* For details see Section 4.

d. *Shell, Flare.* This consists principally of a body containing a candle and a parachute.

(1) *Head.* Made of aluminium alloy, the forward end is screw-threaded to accept the fuze and the rear end is closed by an aluminium alloy base plate which is retained in position by six steel screws. A laminated paper disc is secured to the outer surface of the base by a sintable adhesive. The joint between the rear edge of the head and the base is sealed by an O-ring. A copper driving band is pressed into a groove prepared at the rear end of the head.

(2) *Candle.* Located in the forward end of the shell, the candle consists of a body with a swivel at the top and a quantity of a Bofors composition which produces a sodium light of about 650,000 candlepower with an average duration of 26 seconds. Attached to the periphery of the body is a fin assembly consisting of a strip of spring steel from which protrude three flaps which spring open when the candle is ejected from the shell head. The function of the flaps is to reduce the spin rate of the candle acquired from the shell, thus reducing the burning rate of the composition. The swivel, mounted on ball bearings, is free to rotate about the axis of the candle. The flame shield is attached to the swivel by means of a horizontal bolt.

(3) *Parachute*. The parachute is accommodated in the rear end of the head which is lined by a sleeve in two halves, one of which is in three sections. The parachute and its rigging lines is attached to the canfile by a flame shield includes a fire-proof sheath which is approximately twelve inches in length.

Drill Rounds

89. *Drill Round, 84 mm Inf, Anti-Tank, L42A1*. This is of Swedish manufacture and in many respects it is similar to the practice round, the principal differences being:

a. No propelling charge is incorporated.

b. No tracer is fitted.

c. An aluminium alloy base is fitted to the cartridge case and is screwed on to the rear end of a steel bolt, the front end of which is screwed into the tracer cavity in the base of the exploder body of the shell.

Rounds, Sub-Calibre, Practice

90. *Round, 6.5 mm Tracer, L10A1*. This round is used with Adaptor, Sub-Calibre, 84 mm Ordnance (See Chapter 4) and is a standard 6.5 mm rifle round with a reduced charge, to produce a trajectory performance similar to that of the HEAT shell.

91. *Round, 6.5 mm Inf, Sub-Calibre, Short Range, L11A1*. This round is used with the Adaptor, Sub-Calibre, 84 mm Ordnance (see Chapter 4). The round is used for short range training purposes and is of Swedish manufacture.

84mm FLARE SHELL (SWEDISH MANUFACTURE)

ROUND, 84mm INF, ILLUMINATING, PARA, 144A1, Fuzed 177

(See inside)



SECTION 3 - TRACERS

Tracer, L8 (See Figs 34 & 35)

92. *Tracer, L8A1.* Of Swedish manufacture, this tracer is similar to the L8A2 model described below.

93. *Tracer, L8A2.* Of British manufacture, the L8A2 tracer consists of a body, illuminating, igniting and priming charges, inner and outer washers, and a closing disc. The body, of aluminium alloy, is screw-threaded at one end for attachment to the shell and is bored to accommodate the illuminating charge of 0.4 grams of composition SR 805A, the igniting charge of 0.20 gram each of priming composition SR 370 and illuminating composition SR 805A, and the priming charge of 0.53 gram of composition SR 370. These fillings are retained in the body by an aluminium closing disc fitted between two steel washers. The base of the tracer is marked with the model number (L8A2) and the monogram of the manufacturer of the empty tracer. Marked on the side of the tracer body are the monogram of the filler, filled Lot Number and date of filling (month and year).

SECTION 4 - FUZES

Fuze, Nose, Percussion, Direct Action

94. *Fuze, Nose, Percussion, D.A., L42A1.* This fuze is of Swedish manufacture and is similar to the L42A2 model described in the following paragraphs.

95. *Fuze, Nose, Percussion, D.A., L42A2.* (Figs 37, 38 & 39). Of British manufacture, the fuze detonates on impact with a target up to 60 degrees from the normal. It consists principally of a flanged aluminium alloy body containing magazine and percussion detonator assemblies together with a steel nose, a safety housing.

a locking sleeve and a base which is screwed into the rear end of the fuze body. A rubber cover with its insert is clipped over the nose and a rubber cap is fitted over the base of the fuze to protect it during storage and in transit. This cap is removed before the assembly of the fuze to the shell.

a. Magazine Assembly. The magazine assembly is located partly in the bore of the safety housing assembled in the fuze body and partly in the rear of the percussion detonator assembly. It consists of a CE filling, lower and upper plungers and a safety cone. A seating ring is assembled over the lower plunger and bears against a shoulder formed on the plunger. Also assembled over the lower plunger is the arming spring which is under initial compression between the base of the safety housing and the seating ring.

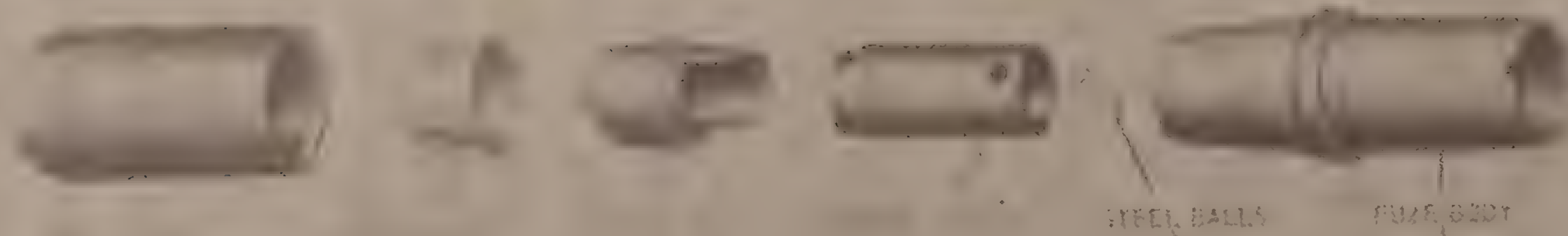
b. Percussion Detonator Assembly. This assembly is located in the forward portion of the fuze body and consists of a case, sleeve, closing plug, a ring of compressed CE, CE filling and initiating composition Z21.

c. Housing Safety. Of aluminium alloy, the safety housing is assembled in the fuze body so that its base seats against the screwed base of the fuze. The housing is formed with two slots, diametrically opposite, in each of which is positioned a steel ball. Assembled over the housing are, a locking sleeve, safety ring and safety spring. In the unarmed position the safety housing is interlocked by the two steel balls with the safety ring, safety cone of the magazine and the locking sleeve.

d. Fuze Nose. Of steel, the nose is assembled to the forward end of the locking sleeve and is retained in position by the interlocking of the lips formed on the nose and the sleeve.

FUZE, NOSE, PERCUSSION, DA L42 A2

EMPTY COMPONENTS

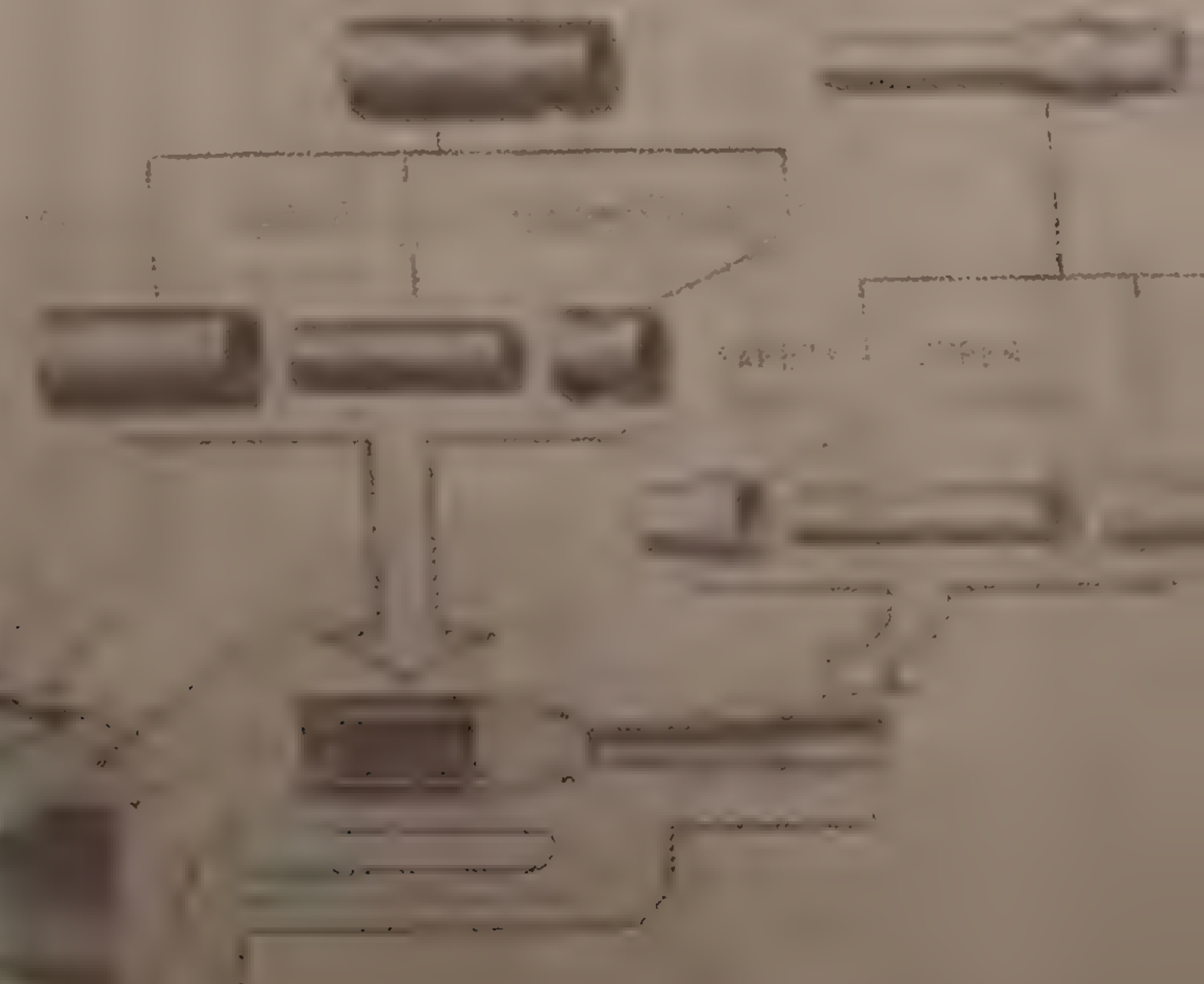
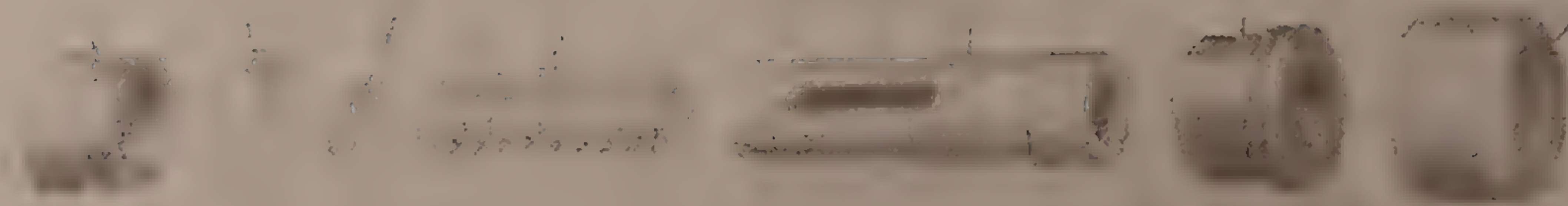


STEEL BALLS

FUZE BODY

SAFETY PIN, CASE PIN, BOLT HEAD, PROTECTING CAP

DETONATOR ASSEMBLY MAGAZINE ASSEMBLY



Arrangements. These are as follows:

- a. The fuse cover protects the nose of the fuse from light rays.
- b. The nose protects the percussion detonator from accidental impact.
- c. The magazine assembly is held in the unarmed position by interlocking of the safety cone, safety ring and the two steel balls.
- d. Should the percussion detonator be accidentally fired before the fuse is armed, the explosive train is arrested by the thickness of the metal at the closed end of the upper plunger of the magazine and additionally, by the detonator and magazine being kept apart by the interlocked components.

e. Preparation for firing. The fuse cover must be removed before firing.

WARNING

If on removing the cover the fuse nose (discard cap) is inadvertently removed, the round must be placed on one side and treated as a blind. On no account must any attempt be made to load or fire a round with a fuse from which the nose (discard cap) has been removed.

f. Action. The action of the fuse is described below:

- a. On Firing. The magazine assembly immediately commences to set back, compressing the arming spring. Simultaneously, the safety ring and safety spring set back, the lip formed on the ring forcing the steel balls towards the centre of the fuse.

PUZE, NOSE, PERCUSSION, DA 142A2

SECTIONS SHOWING PROGRESSIVE ARMING ACTION

INITIAL SETBACK ON FIRING

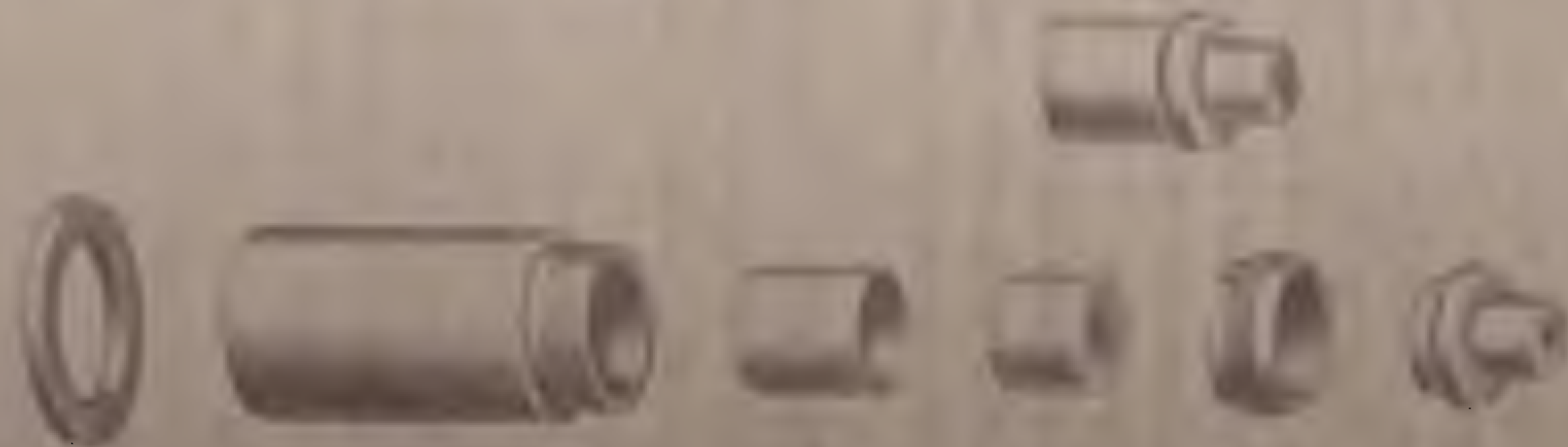
2 AFTER FIRING ACCELERATION
CEASES

3 ARMED POSITION IN FLIGHT

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EXPLODER & DISTANCE TUBE ASSEMBLY - FIG 1A1A2 TO SHELL 64-20 BL-AT

EMPTY DETAILS



CONTINUED ON SHEET 20-13

b. *During Flight.* As deceleration sets in, the frictional action of the safety spring retards the forward movement of the safety sleeve, thus preventing the magazine assembly from becoming re-locked in the unarmed position. At the same time, the arming spring reasserts itself to push forward the magazine, the tapered cone of which forces the two steel balls outwards to engage in the holes of the locking sleeve. The sleeve now moves forward with the magazine assembly which fully engages with the detonator assembly to form a continuous detonating train. During its forward movement the locking sleeve forces the fuze nose forward until it disengages from the fuze and falls away. The end of the detonator is now exposed and the arming of the fuze is completed.

c. *On Impact.* The force of impact initiates a chain of detonation from the detonator to the magazine and from thence to the exploder assembled in the distance tube of the shell.

99. *Fuze, Nose, Time, L77A1 (Fig 40).* This is a simple time fuze of Swedish manufacture which consists, principally, of a body, time-train ring, nose, hammer, safety spring, firing pin, safety pins and explosive elements.

a. *Body.* Of aluminium, the body is formed with a platform having a bevelled edge below which it is reduced in diameter and screw-threaded for attachment to the shell. Formed above the platform is a stem which is screw-threaded externally to receive the nose. Internally, the stem is bored centrally to house a firing pin, safety spring and the lower portion of a hammer fitted with a detonator and a safety washer. Four flash-holes, drilled through the side of the stem connect with the central boring and a circumferential flash channel. A magazine is formed in the base for the main charge and is connected by an oblique channel to a recess containing a black powder pellet. A small recess in the top surface of the platform holds a spring upon which rests a steel ball, these two components forming a clicking device for setting the fuze to function at ranges of 600, 1100 and 1700 metres.

The top surface of the platform is slightly recessed to accommodate a felt washer and two slots are cut in the edge to facilitate the use of an assembly tool. A setting line is engraved for reading against the range markings on the time-train ring; also engraved are the fuze model number (L77A1), the initials or monogram of the filler, the filled lot number and the date of filling, month and year. The main charge in the magazine is covered by a tinfoil disc and a perforated washer which is retained in position by a circlip.

b. Time-train Ring. Made of aluminium and fitted on the stem of the body, the ring is formed with a bevelled edge which is graduated in 23 numbered divisions, each representing a range of one hectometre (100 metres). Each numbered division (excluding the 0-1 division) is sub-divided into two, the graduations of the sub-divisions being unnumbered. In addition, a safety line is engraved with the letter 'S' above it. Two vertical slots, diametrically opposite, are cut in the edge of the ring to facilitate the use of an assembly tool and a hole bored in the side is provided for the insertion of a fuze setting tool. An oblique channel connects with a train groove cut in the underside of the ring and a recess containing a black powder pellet. The channel is filled with an igniter composition and the train groove is filled with black powder. The top surface of the ring is slightly recessed to accommodate a broadcloth washer.

c. Nose. Made of aluminium, the dome-shaped nose is screw-threaded internally for assembly to the body. A hole, bored through one side of the nose, receives the safety pin and an external groove is prepared to take the retaining wire of the safety pin. On assembly to the body, the nose is retained in position by a small screw which is screwed into the top surface of the stem of the body.

d. Safety Pin. This is a steel pin which passes through the hole bored in the side of the nose and engages in a circumferential groove cut in the hammer. Its function is to lock the

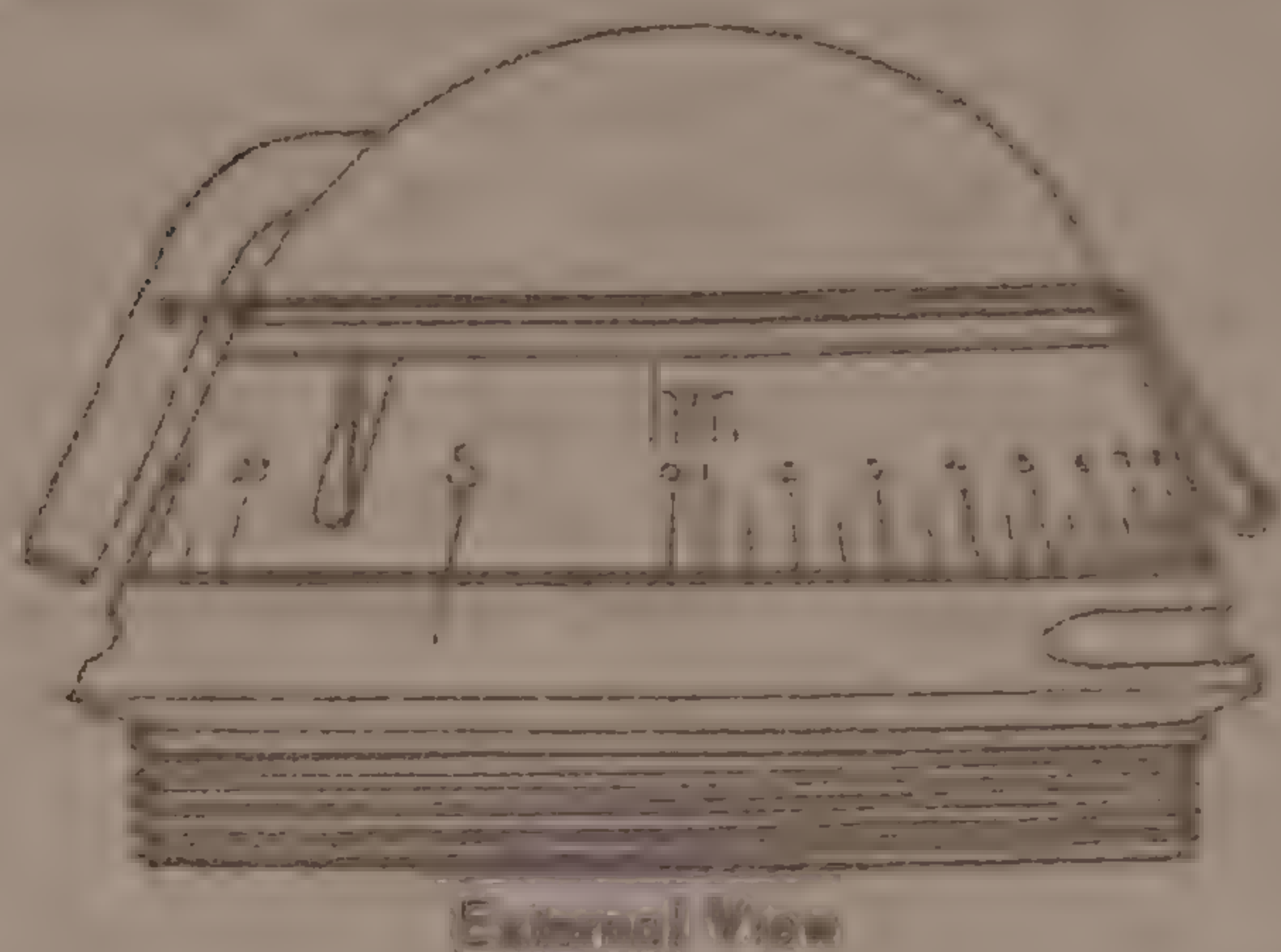


Fig 40 Fuse, Time, LTT (Broadcloth design)

hammer, with its detonator, in the safe position, thereby preventing the detonator from impinging on the firing pin during handling, storage and transport. Although primarily a safety device, the safety pin may be used, also, as a fuze setting tool, by inserting the handle of the pin in the hole prepared in the side of the time-train ring for the fuze setting key.

Safety Arrangements. These are as follows:

- a. The detonator cannot impinge on the firing pin all the time the safety pin is in position.
- b. Initially, the fuze is set to the 'S' (safe) position. In this position the detonator and igniting composition is masked from the train filling and the magazine.
- c. The safety washer on the hammer and the safety spring have to be overcome by set-back before the detonator can impinge on the firing pin.
- d. The fuze cannot be set to function at less than 200 metres from the muzzle of the gun.

Preparations for Firing. These are as follows:

a. Remove the safety pin.

b. Using the fuze setting key or the fuze safety pin, set the fuze by turning the time-train ring in an anti-clockwise direction until the graduation of the range required coincides with the setting line on the body. At night, when visual setting is not possible or is undesirable, the fuze may be set to three pre-determined ranges (600, 1100 and 1700 metres) by turning the time-train ring in an anti-clockwise direction (commencing from the 'S' or safe position) until the ring is heard and felt to click into the required range setting. It should be noted that the first click denotes the 1700 metres setting, the second

click denotes the 1100 metre setting and the third click denotes the 600 metre setting.

NB. Should a prepared round not be fired, the fuze must be re-set to the safe position and the safety-pin replaced.

102. *Action.* On firing set-back overcomes the safety washer and compresses the safety spring, allowing the detonator to impinge on the firing pin. The flame from the resultant explosion ignites the igniter composition and pellet, which, in turn, ignites the train composition which burns until the pellet in the body is reached. This pellet is ignited, the flame passing through the oblique channel to the magazine causing the main charge to burn and ignite the illuminating charge in the shell. The burning time of the time-train equals the time of flight corresponding to the set distance on the fuze.

SECTION 5 - PACKAGING

103. The packages described hereunder are painted and details of their contents are marked, in accordance with principles laid down in the "Joint Services Ammunition and Ammunition Packing Markings Handbook" (Ministry of Defence No. DG 1001), now being revised to include marking details to be used under NATO agreements. As a temporary measure information about these markings can be obtained in the "Guide to Colour Coding and Marking of Ammunition and Associated Packages" (Code No. JAMSC C-2) which is not a general issue publication.

104. Details of current ammunition packages are given in Table 1 shown at the end of this section. Illustrations of certain packages and methods of packing are shown in Fig 41.

OUTER PACKAGE



INNER PACKAGE

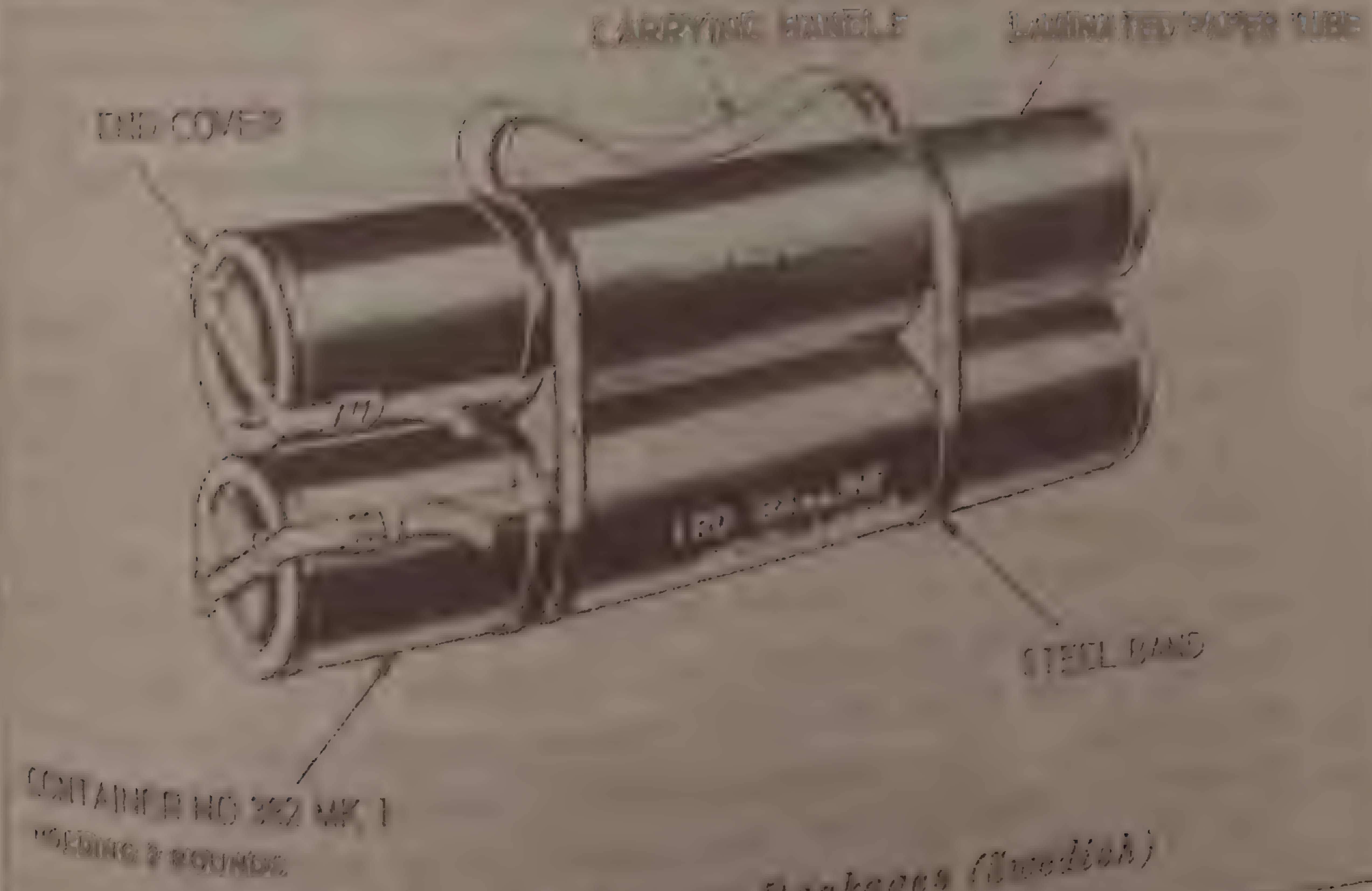


Fig 41 Outer & Inner Packages (Woodcock)

Outer Packages

105. Current outer packages are:

a. *Box, C238, Mk.2.* This is a rectangular metal box which is provided with two steel lifting handles and a hinged lid which is secured in the closed position by two catches. Internally, a false metal end is riveted to each end of the box. Four drain holes are drilled in the base of the box and two ventilation holes are provided near the top edge of each end. The lid is embossed with the legend "C238 Mk.2 - SV57A" together with the Contractor's initials or recognised trade mark and year of manufacture.

b. *Ammunition Container, L6A1.* This is a rectangular metal box which is provided with two steel lifting handles and a hinged lid which is secured in the closed position by two catches. Internally, a metal plate is riveted to each end of the box and two rubber cushioning strips are affixed to the base and two affixed to the back of the box. Four drain holes are drilled in the base of the box and two ventilation holes are provided near the top edge of each end. The base of the box is embossed with the legend "AMM CONT L6A1 - SV 501A" together with the monogram of the manufacturer and year of manufacture.

c. *Ammunition Container, L5A1.* The L5A1 Ammunition Container is of Swedish manufacture and holds one Drill Round, 84 mm Inf, Anti-Tank, L42A1. It consists principally of a tube of cylindrically wrapped Kraft paper, a lid assembly, carrying handle and fastening strap. The tube, moisture and vapour proofed, is closed at one end by a tinplate base, the open end being protected by a tinplate ring. Internally, the tube is fitted with two Kraft paper inserts which are cemented in position. The carrying handle, made of cotton webbing, is retained in position by two metal clips which are assembled over the tube. The lid assembly consists of a tinplate lid to which is spot welded a steel strap guide. To prevent the

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ingress of dirt and moisture a rubber sealing ring is glued to the underside of the lid. The fastening strap of cotton webbing passes through slots formed in the strap guide of the lid and is secured to the container by one of the metal clips. A loose insert ring, consisting of a ring of Kraft paper and a ring of foam plastic secured together by an adhesive is provided to cushion the base of the round. The legend "RD 84 mm INF DRILL A/TK L42A1" is marked on the tube of the container.

Inner Packages

106. Current inner packages are:

a. *Ammunition Container, L202A1.* This is of tubular construction and is manufactured from spirally wound Kraft/Polythene Kraft paper with an outer skin of polythene straight wound to give increased waterproofing. It is made up principally of a liner, body and an end cap, the body and end cap each being fitted at one end with a metal lid. When filled, the joint between the body and end cap of the container is sealed by an adhesive tape with a 'tear-off' end. Each lid is embossed with the legend "AMM CONT L202A1 - SV 498A" together with the monogram of the manufacture and year of manufacture.

b. *Ammunition Container, L207A1.* This container consists principally of a moulded polythene body and cap. The body, cylindrical in shape, is slightly tapered and is formed with two slotted lugs which take the clips of the lifting harness. Four other projections prevent the container from rolling when stored after removal from the outer container. The body is formed with interrupted threads near the mouth for the acceptance of the cap which is assembled with a rubber sealing ring. The round is prevented from rotational movement in the container by a projection on the body of the container engaging in the slot cut in the rim of the cartridge case. When filled the joint between the body and cap of the container is

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bound with an adhesive tape having a 'tear-off' end. The tape is marked with the legend "AMM CONT L207A1 51 517 1" together with the monogram of the manufacturer and date of manufacture.

c. Container, No. 332, Mt 1. This container comprises two tubes, each made of laminated paper and closed at one end by a metal base. The tubes are strapped together by a harness consisting of two steel bands and a webbing strap carrying a handle. Each tube holds a single round of ammunition and is sealed at one end by a metal lid with a webbing fastening strap secured by a clip assembled over the tube.

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Line	Desc	Outer Package	Inner Package(s)	Ammunition and Qty per Package	Storage Dimensions (approx) per Package (lin)	Net Weight (approx) per Package (lbs)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	Ammunition Container Assembly No. 28 (D28A1)	Box, C238, M2.2 With 8 Ammn Con. L202A1 and fittings as necessary.		4 Rounds, Practice, L41A1	22.9 x 10.1 x 8.8	26
			4 Ammunition Containers L202A1 fittings as necessary	1 Round, Practice, L41A1	22.9 x 10.1 x 8.8	26

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TABLE 1 - continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2	Ammonium Chloride Assembly No. 187, Mk. 1 (Swedish)	Boarder Crash, 1576, Mk. 1 With 3 Con. No. 382, Mk. 1 and 61- ments as necessary.		5 Boards, HEAT, L. 40A0 or Fraction, L. 41A2 or L. 41A3	25.9 x 38.3 x 9.8	57
			3 Con. No. 382, Mk. 1 Each Con. consisting of 2 tubes stayed together.	3 Boards, HEAT, L. 40A4 or Fraction, L. 41A2 or L. 41A3	28.35 x 4.3 x 8.0	14.75

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(a)	(b)	(c)	(d)	(e)	(f)	(g)
3	Ammunition Container Assembly, L224A1 (British)	Ammunition Container, L6A1 With 6 Ammo. Con. L207A1 and packing fitments as necessary.		6 Rounds, HEAT, L40A3 or Practice, L41A3	24 x 16.5 10.8	80
			6 Ammunition Containers, L207A1 These con. are harnessed in pairs and details in cols (f) and (g) are given accordingly.	2 Rounds, HEAT, L40A3 or Practice, L41A3 (in 2 Containers)	5.3 x 4.8 22.1	13.25
4	Ammunition Container, L3A1 (Swedish)			1 (HEAT) Round, L12A1	23.2 x 4.4 4.4	5.5

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AIMING CHART - RULES FOR TARGET AIMING

HEAD ON OR GOING AWAY TARGETS
SHOWING ONLY THE FRONT OR BACK

Target is shown as follows:



CROSSING TARGETS MOVING AT AN ANGLE
SHOWING SIDE SIDE

NOTE - In order to remain forward and the
pointer must always be forward of
the center of a moving target.

THREE TYPES OF MOVING TARGET APPROACHING FROM RIGHT

SLOW

(approx 10 m.p.h.)
First leadmark is
center of target.



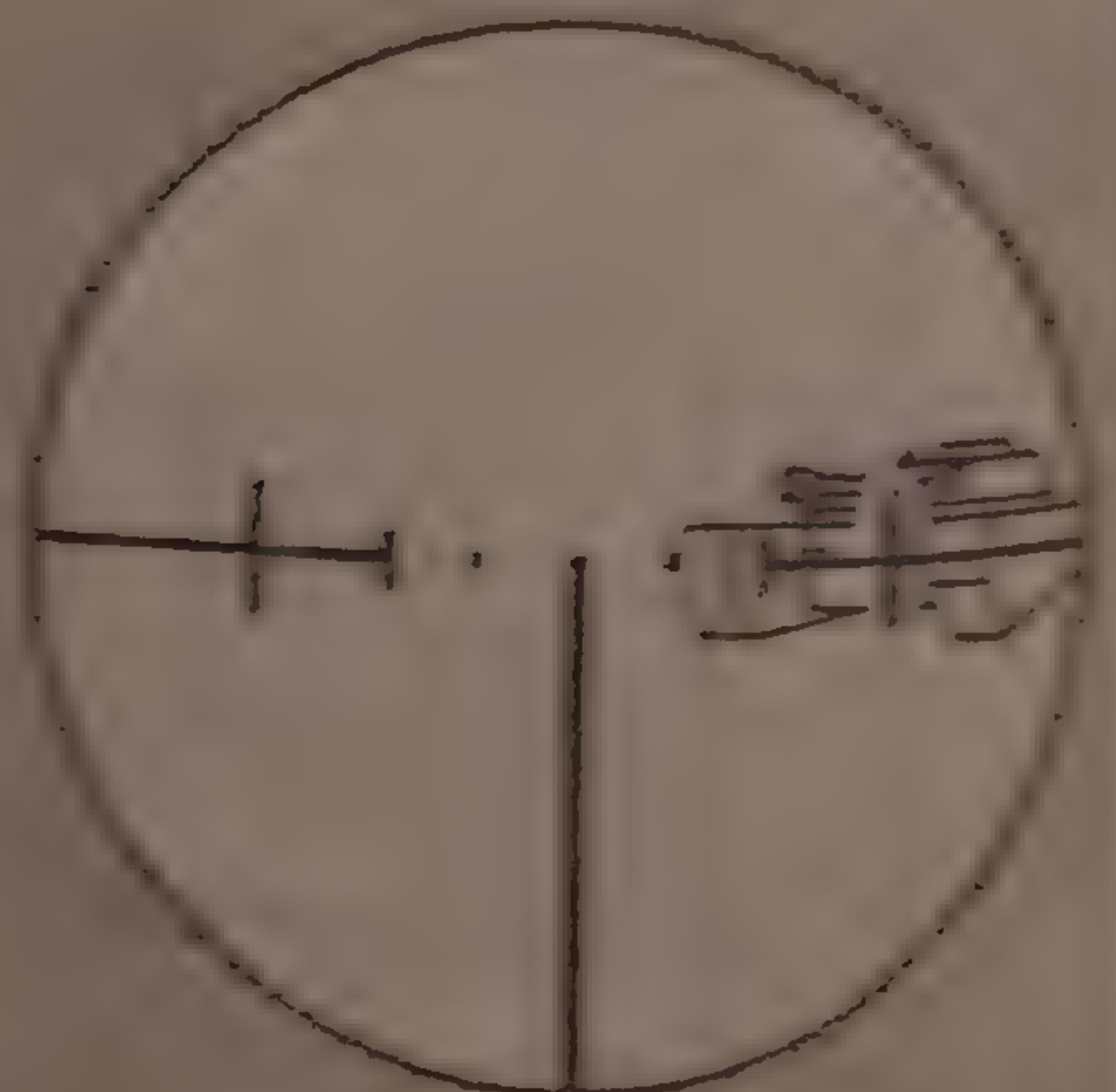
FAST

(approx 20 m.p.h.)
Second leadmark is
center of target.



VERY FAST

(approx 35 m.p.h.)
Third leadmark is
center of target.



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ANNEX B
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DISABLEMENT AND DESTRUCTION OF EQUIPMENT

The extent to which an equipment is disabled or destroyed will depend upon the time available and the probability of its capture by our own forces.

There are normally three stages to be considered:

a. Disablement to an extent which will allow the equipment to be brought back to a serviceable condition soon after recapture.

b. Disablement to an extent which will require repair before the equipment can be brought back to a serviceable condition.

c. Destruction.

It is essential when disabling equipments that the same procedure is followed by all personnel so that all equipments are disabled in the same manner to obviate the chance of complete equipments being made up from those captured.

When disablement is carried out by the removal of parts of an equipment any spares carried, either on the equipment or in a store which is liable to capture, must also be removed.

Any documents, notes, instructions, or other written material pertaining to function, operation, maintenance, or employment, including drawings or part lists, must be destroyed in a manner to render them useless to the enemy.

To disable a gun so that it can be brought back to a serviceable condition soon after recapture. Remove and retain or bury the firing rod, firing pin and sight unit.

To disable a gun so that it can be brought back to a serviceable condition after repair. Remove and damage the firing rod, firing pin and all sighting systems.

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8. *Destruction.* The following actions will prove effective:

a. Plug the barrel near the chamber or bury the muzzle in the ground; load, and fire by remote control from behind cover.

b. Strip, as far as possible; bury and/or scatter remaining parts over a wide area.

c. Retain essential parts of the mechanism that remain, such as usable firing pins, etc.

d. Do not neglect the disposal of spare parts.

9. Should the foregoing destruction drill not be possible, other methods must be devised, eg, destroying by explosive charges or fire; running over by vehicles; scattering components in rivers and undergrowth. Unfired ammunition can be destroyed by explosives using improvised demolition charges made up with grenades, bombs, etc.

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ANNEX C
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CONVERSION TABLES

DEGREES - MILS - DEGREES

•

YARDS - METRES - YARDS

•

INCHES - MILLIMETRES - INCHES

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1. This table can be used to convert degrees to mils and mils to degrees.

To convert degrees and minutes to mils

2. Enter the left hand column at the nearest 10 degrees below the figure to be converted. Leave horizontally across the table to a point vertically below the unit figure required and record the mils figure. Enter the smaller table at the number of minutes to be converted, to the nearest five minutes, and add the equivalent number of mils to the figure already recorded.

To convert mils to degrees and minutes

3. Enter the body of the table and find the greatest number of mils in the table below the figure to be converted, by moving horizontally and vertically to the 'tens' and 'units' degrees record the number of degrees. In the smaller table find the figure, in the mils column, nearest to the difference between the number of mils found in the table and the number to be converted and record the equivalent number of minutes.

Degrees	0	1	2	3	4	5	6	7	8	9	mins.	mils
0	0	18	36	53	71	89	107	124	142	160	5	1.5
10	178	196	214	231	249	267	285	302	320	338	10	3
20	356	374	392	409	427	445	463	480	498	516	15	4.5
30	533	551	569	586	604	622	640	657	675	693	20	6
40	711	729	747	764	782	800	818	835	853	871	25	7.5
50	889	907	925	942	960	978	996	1013	1031	1049	30	9
60	1067	1085	1103	1120	1138	1156	1174	1191	1209	1227	35	10.5
70	1244	1262	1280	1297	1315	1333	1351	1368	1386	1404	40	12
80	1422	1440	1458	1475	1493	1511	1529	1546	1564	1582	45	13.5
90	1600	1618	1636	1653	1671	1689	1707	1724	1742	1760	50	15
100	1778	1796	1814	1831	1849	1867	1885	1902	1920	1938	55	16.5
110	1956	1974	1992	2009	2027	2045	2063	2080	2098	2116	60	18

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Degrees	0	1	2	3	4	5	6	7	8	9
120	2133	2151	2169	2186	2204	2222	2240	2257	2275	2293
130	2311	2329	2347	2364	2382	2400	2418	2435	2453	2471
140	2489	2507	2525	2542	2560	2578	2596	2613	2631	2649
150	2667	2685	2703	2720	2738	2756	2774	2791	2809	2827
160	2844	2862	2880	2897	2915	2933	2951	2968	2986	3004
170	3022	3040	3058	3075	3093	3111	3129	3146	3164	3182
180	3200	3218	3236	3253	3271	3289	3307	3324	3342	3360
190	3378	3396	3414	3431	3449	3467	3485	3502	3520	3538
200	3556	3574	3592	3609	3627	3645	3663	3680	3698	3716
210	3733	3751	3769	3786	3804	3822	3840	3857	3875	3893
220	3911	3929	3947	3964	3982	4000	4018	4035	4053	4071
230	4089	4107	4125	4142	4160	4178	4196	4213	4231	4249
240	4267	4285	4303	4320	4338	4356	4374	4391	4409	4427
250	4444	4462	4480	4497	4515	4533	4551	4568	4586	4604
260	4622	4640	4658	4675	4693	4711	4729	4746	4764	4782
270	4800	4818	4836	4853	4871	4889	4907	4924	4942	4960
280	4978	4996	5014	5031	5049	5067	5085	5102	5120	5138
290	5156	5174	5192	5209	5227	5245	5263	5280	5298	5316
300	5333	5351	5369	5386	5404	5422	5440	5457	5475	5493
310	5511	5529	5547	5564	5582	5600	5618	5635	5653	5671
320	5689	5707	5725	5742	5760	5778	5796	5813	5831	5849
330	5867	5885	5903	5920	5938	5956	5974	5991	6009	6027
340	6044	6062	6080	6097	6115	6133	6151	6168	6186	6204
350	6222	6240	6258	6275	6293	6311	6329	6346	6364	6382
360	6400	6418	6436	6453	6471	6489	6507	6524	6542	6560

degree = 1

1 mil

= 3.375 minu

CONVERSION TABLE

YARDS - METRES - YARDS

YARDS	YARDS METRES	METRES
1.1	1	.9
2.2	2	1.8
3.3	3	2.7
4.4	4	3.7
5.5	5	4.6
6.6	6	5.5
7.7	7	6.4
8.7	8	7.3
9.8	9	8.2
10.9	10	9.1
21.9	20	18.3
32.8	30	27.4
43.7	40	36.6
54.7	50	45.7
65.6	60	54.9
76.6	70	54.0
87.5	80	73.2
98.4	90	82.3
109.4	100	91.4
218.7	200	182.9
328.1	300	274.3
437.4	400	365.8
546.8	500	457.2
656.2	600	548.6
765.5	700	640.1
874.9	800	731.5
984.3	900	823.0
1093.6	1000	914.4
1203.0	1100	1005.8
1312.3	1200	1097.3
1421.7	1300	1188.7
1531.0	1400	1280.2
1640.4	1500	1371.6
1749.8	1600	1463.0

YARDS	YARDS METRES	METRES
1859.1	1700	1554.5
1968.5	1800	1645.9
2077.9	1900	1737.4
2187.2	2000	1828.8
2296.6	2100	1920.2
2405.9	2200	2011.7
2515.3	2300	2103.1
2624.7	2400	2194.6
2734.0	2500	2286.0
2843.4	2600	2377.4
2952.8	2700	2468.9
3062.1	2800	2560.3
3171.5	2900	2651.8
3280.8	3000	2743.2
3390.2	3100	2834.7
3499.6	3200	2926.1
3608.9	3300	3017.5
3718.3	3400	3109.0
3827.6	3500	3200.4
3937.0	3600	3291.9
4046.4	3700	3383.3
4155.7	3800	3474.7
4265.1	3900	3566.2
4374.4	4000	3657.6
4483.8	4100	3749.0
4593.2	4200	3840.5
4702.5	4300	3931.9
4811.9	4400	4023.4
4921.2	4500	4114.8
5030.6	4600	4206.3
5140.0	4700	4297.7
5249.3	3800	4389.1
5358.7	4900	4480.6
5468.0	5000	4572.0

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CONVERSION TABLE

INCHES - MILLIMETRES - INCHES

INCHES	MILLIMETRES
1	25.4
2	50.8
3	76.2
4	101.6
5	127.0
6	152.4
7	177.8
8	203.2
9	228.6
10	254.0
11	279.4
12	304.8
24	609.6
36	914.4

MILLIMETRES	INCHES
10	.39
20	.79
30	1.18
40	1.58
50	1.97
60	2.36
70	2.76
80	3.15
90	3.94
100	3.94
200	7.87
300	11.81
400	15.75
500	19.69
1000	39.37